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NOTES ON MIMOSOIDEAE : I.

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All cited specimens are, unless otherwise indicated, in the Herbarium of the Royal Botanic Gardens, Kew.

Entada

Until recently the African climbing Entadas with gigantic pods have been generally assumed to belong to a single species, which has been variously called *Entada scandens* (L.) Benth., *E. gigas* (L.) Fawc. & Rendle, or *E. phaseoloides* (L.) Merr.

Gilbert & Boutique (in Fl. Congo Belge, **3,** 220–222 : 1952) recognised that previous classifications had been incorrect, and distinguished three species, *E. gigas* (L.) Fawc. & Rendle, *E. planoseminata* (De Wild.) Gilbert & Boutique, and *E. umbonata* (De Wild.) Gilbert & Boutique.

In fact there appear to be only two species in tropical Africa, one with flowers on pedicels about 1–1·5 mm. long and spirally twisted pods, the other with flowers sessile or nearly so (pedicel to 0·5 mm.) and straight pods.

The nomenclature of the first species has been satisfactorily settled by I. M. Johnston in Sargentia, **8,** 135–138 (1949), with whose conclusions on this matter I am in agreement. It is *E. gigas* (L.) Fawc. & Rendle, which is confined to the New World and to West and Central Africa, and which is typified by a Jamaican plant. Gilbert & Boutique (*vide supra*) misapplied the name *E. gigas* to the plant with sessile or subsessile flowers, but their other species *E. planoseminata* and *E. umbonata* both appear conspecific with *E. gigas* in Johnston's sense, to whose paper reference should be made for further information.

To find the correct name for the second species (with sessile or subsessile flowers and straight pods) presents a much more difficult problem. It can be satisfactorily matched with gatherings from tropical Asia. However the Asiatic material of this group, usually all named *E. scandens* (L.) Benth., shows that at any rate four entities are involved:—

A : Leaflets 1–2 (–3) pairs. Pod straight or curved but not twisted. Inner layer of pod of the consistency of tough parchment.

B : Leaflets 3–4 (–5) pairs. Pod straight or curved but not twisted. Inner layer of pod thick, rigid, woody. Axis of inflorescence subglabrous to somewhat pubescent. Calyx glabrous.

C : As in B, but axis of inflorescence densely pubescent, and calyx pubescent.

D : Distinguished from A, B and C by spirally twisted pods and obovate leaflets glaucous or glaucescent beneath.

The second African species is identifiable with entity B, and neither A, C or D appear to occur except in Asia.

The application of certain names must now be discussed :—

E. phaseoloides (L.) Merr. (*Lens phaseoloides* L.). Johnston in Sargentia, **8,** 136–7 (1949) has shown that the type of *E. phaseoloides* is the excellent description and plate of *Faba marina* by Rumphius, Herb. Amboin. **5,** pp. 5–8, t. 4 (1750). His plate shows leaflets in 1–2 pairs and straight pods, and on p. 6 he describes the inner layer of the pod as " tenuis est, gilvus seu flavescens, durus ac lentus instar fortissimae chartae ". These points indicate that *E. phaseoloides* was based on entity A.

E. scandens (L.) Benth. (*Mimosa scandens* L.). Johnston (vide supra) has pointed out that *Mimosa scandens* L. was an aggregate species, best restricted to the Amboina plant described and figured by Rumphius, and that *E. scandens* thus becomes a synonym of *E. phaseoloides*. Both names thus refer to entity A, which does not occur in Africa.

E. monostachya DC., Mém. Leg. 422 (1825) ; Prodr. **2,** 425 (1825). This is typified by the plate and inadequate description by Rheede, Hort. Malabar. **9,** p. 151, t. 77 (1689). The only entity of which I have seen material from the Malabar coast is B, with certain gatherings of which Rheede's plate can be matched. The plate shows leaves and flowers, but no pods ; the leaflets are in 4–5 pairs, and the flowers are borne on a spike which is solitary in a leaf-axil.

E. pursaetha DC., Mém. Leg. 421 (1825) ; Prodr. **2,** 425 (1825).

This was based on :—

(1) A specimen that De Candolle had himself seen. This (see below) is proposed as the lectotype of *E. pursaetha*.

(2) " *Mimosa scandens* Roxb." Although Roxburgh's description (Fl. Ind. **2,** 554 : 1832) was not published until later, his manuscript and paintings would, my colleague Mr. J. R. Sealy informs me, have been available to De Candolle in 1825. Roxburgh's painting of *M. scandens* (No. 2272) is at Kew and shows flowers and a pod. Both painting and description probably refer to C (note the mention of " ferruginous pubescence " on the inflorescence). The plant illustrated probably came from Sylhet (see Fl. Ind., *l.c.*), where C has been collected more than once. The mention of spiral twisting of the pod (*l.c.*) probably, according to the painting, refers to an open falcate curve to the pod, too open for D, and not a true twist as in *E. gigas*.

(3) Rheede, Hort. Malabar **8,** t. 32–4 (1689). Is most probably B ; similar comments apply here to those made above under *E. monostachya.*

(4) 644, Pusaetha in Linn., Fl. Zeyl. 236 (1747) (" Herm. zeyl. 44 "). Probably B. No specimen found in Hermann's Herbarium at the British Museum (Natural History).

(5) Rumph. Herb. Amboin. **5,** t. 4 (1750). Is A (see remarks above).

The synonyms are thus a mixture. However De Candolle (Mém. Leg., *l.c.*) states that he had personally examined a flower of his *E. pursaetha,* and there is in the De Candolle herbarium at Geneva a specimen of it, consisting of leaves and inflorescences, with the label " Colitur in insul. franciae. M. B. Delessert, 1822." This should, I propose, be taken as the lectotype of *E. pursaetha.* Dr. A. Becherer, on behalf of the Director of the Conservatoire et Jardin Botaniques at Geneva, Prof. C. Baehni, very kindly sent a photograph of this specimen. It shows that the flowers are sessile or nearly so, and that there are 4 pairs of elliptic or obovate-elliptic leaflets. In response to a request for further information about this specimen, Dr. C. E. B. Bonner kindly wrote to me that " the stems are glabrous, the axes of the inflorescence sparsely hairy and the calyces are likewise glabrous." These characters, and the facies of the specimen as shown by the photograph, indicate that *E. pursaetha* DC. is to identified with entity B. In the bottom right-hand corner of the sheet is a manuscript label reading " Je crains que l'etiquette de patria de cette espèce n'ait été transposée avec celle de la précédente ". Dr. Bonner writes that the label is in De Candolle's handwriting, and adds : " We do not seem to have any specimen of the ' preceding species ' in that genus (this is the manner in which I interpret the label). I have searched the Delessert collection for a duplicate of the type, without success. I have however found a specimen ' cult. Ile de France ' Leg. Martin which appears to match the DC. type fairly well. It may well be therefore that De Candolle's fears were unfounded." To the gentlemen at Geneva mentioned above I am most graful for their assistance in this problem.

Entada pursaetha was described by De Candolle in two different publications, both bearing the date 1825—in the second volume of the " Prodromus " and in the twelfth of his " Mémoires sur la Famille des Légumineuses ". Stearn (in Candollea **8,** 2 : 1939) has ascertained that the volume of the " Prodromus " was published in mid-November 1825 ; while the " Mémoires " were published in parts, of which that containing the twelfth memoir was not published until 1826, probably about August. The parts of the Mémoires were reviewed, as they appeared, in Bull. Sci. Nat., and that one which concerns us is noted in Bull. Sci. Nat. **9,** 52 (Sept. 1826). It is thus clear that *Entada pursaetha* was published first in the " Prodromus ".

However, another name for this species was also published in 1825, *Entada rheedii* Spreng. Syst. **2,** 325 (1825). I am unable to find any evidence about the exact date of publication of the second volume of Sprengel's " Systema ", except that it probably was published in 1825. Unless further evidence appears, it seems necessary to take *E. pursaetha*

and *E. rheedii* as published at the same time, and since a choice between the two does not seem to have been made previously, *E. pursaetha*, which can be well typified, and which has been adopted as the name of the common Ceylon plant by Alston, Fl. Ceylon, **6,** 95 (1931), is here chosen as the correct name for the species.

The distribution of *E. pursaetha* is very wide, from West and East Africa eastwards to China, Guam, New Guinea and northern Australia.

E. gogo (Blanco) I. M. Johnst. in Sargentia, **8,** 137 (1949) (*Adenanthera gogo* Blanco, Fl. Filip., ed. 1, 353 (1837)). Johnston apparently considered *E. pursaetha* DC. to correspond with entity C, and therefore made the new combination *E. gogo* for entity B. In my view, however, both *E. gogo* and *E. pursaetha* refer to B, and *E. gogo* thus becomes a synonym of *E. pursaetha.*

The nomenclature of these various entities may be summed up as follows :—

Africa

1. **Entada gigas** (*L.*) *Fawc. et Rendle,* Fl. Jamaic. **3** (**2**), 124 (1920).

   Mimosa gigas L., Fl. Jamaic. 22 (1759).

   Entada scandens (L.) Benth. subsp. *planoseminata* De Wild., Pl. Bequaert. **3,** 85 (1925).

   Entada scandens (L.) Benth. subsp. *umbonata* De Wild., Pl. Bequaert. **3,** 86 (1925).

   Entada planoseminata (De Wild.) Gilbert et Boutique in Fl. Congo Belge, **3,** 221 (1952).

   Entada umbonata (De Wild.) Gilbert et Boutique in Fl. Congo Belge, **3,** 222 (1952).

2. **Entada pursaetha** *DC.* in Prodr. **2,** 425 (1825) ; et Mém. Leg. 421 (1826).

   Mimosa entada L., Sp. Pl. 518 (1753).

   Entada rheedii Spreng., Syst. **2,** 325 (1825).

   Entada monostachya DC. in Prodr. **2,** 425 (1825) ; et Mém. Leg. 422 (1826).

   Adenanthera gogo Blanco, Fl. Filip., ed. I, 353 (1837).

   Entada cirrhosa Raf., Sylva Tellur. 119 (1838).

   Entada schefferi Ridl. in Journ. Bot. **58,** 195 (1920).

   Entada gogo (Blanco) I. M. Johnst. in Sargentia, **8,** 137 (1949).

Asia

A. **Entada phaseoloides** (*L.*) *Merr.* in Philipp. Journ. Sci. **9,** 86 (1914).

   Lens phaseoloides L., Herb. Amboin. 18 (1754).

   Mimosa scandens L., Sp. Pl., ed. 2, 1501 (1763).

   Entada parrana Spreng., Syst. **2,** 325 (1825) *nom. illegit.*

   Perima odorata Raf., Sylva Tellur. 118 (1838).

Entada scandens (L.) Benth. in Hook., Journ. Bot. **4,** 332 (1841).

Entada gandu Hoffm. ex Walp., Repert. **1,** 858 (1842).

Entada rumphii Scheffer, in Natuurk. Tijdschr. Nederl. Ind. **32,** 90, tt. 17 & 18 B (1872).

B. **Entada pursaetha** *DC.* (see above, under Africa).

C. No name appears to be available for this entity, which is found in North-eastern India, from Nepal to Assam, and in Burma, also in Yunnan (*Henry* 13008). It is exemplified by, among other specimens, *Wallich* 5294 a and b. See also a note by Ridley in Journ. As. Soc. Bengal **67** (**2**), 307 (1898).

D. **Entada spiralis** *Ridl.* in Journ. As. Soc. Bengal, **67** (**2**), 305 (1898).

Entada africana *Guill. et Perr.* in Guill., Perr. & A. Rich., Fl. Senegamb. Tent. 233 (1832) ; Oliv. in Fl. Trop. Afr. **2,** 326 (1871) ; Benth. in Trans. Linn. Soc. **30,** 364 (1875) ; Hutch. & Dalz., Fl. W. Trop. Afr. **1,** 355 (1928) ; Bak. f., Leg. Trop. Afr. 786 (1930) ; Aubréville, Fl. Forestière Soudano-Guinéenne, 292, 294 (1950).

Entada sudanica Schweinf., Reliq. Kotschyanae, 8 (1868) ; Oliv. in Fl. Trop. Afr. **2,** 327 (1871) ; Benth. in Trans. Linn. Soc. **30,** 364 (1875) ; Hutch. & Dalz., Fl. W. Trop. Afr. **1,** 355 (1928) ; Bak. f., Leg. Trop. Afr. 789 (1930) ; Aubréville, Fl. Forest. Soudano-Guinéenne, 292, 294 (1950).

Pusaetha africana (Schweinf.) O. Ktze., Rev. Gen. **1,** 204 (1891).

Pusaetha sudanica (Schweinf.) O. Ktze., Rev. Gen. **1,** 204 (1891).

Entada ubanguiensis De Wild., Pl. Bequaert. **3,** 88 (1925).

Entadopsis sudanica (Schweinf.) Gilbert et Boutique in Fl. Congo Belge, **3,** 204 (1952).

Guillemin & Perrottet based their *Entada africana* on plants from "prope Tiélimane in regno Cayor, circà Kounoun in peninsulâ Promontorii-Viridis, et Albreda ad Gambiam." The pinnae were described as 2–4-jugate, the leaflets as 8–15-jugate, 4–5 lines lone and ½ a line wide, with some hair beneath.

Through the courtesy of the authorities of the Conservatoire Botanique at Geneva, I have been enabled to see various early specimens of *E. africana*, including one collected in Senegal, at Tiélimane, Cayor, in June 1825, by *Leprieur*, and another from Albreda on the Gambia, collected in Mar. 1829, by *Perrottet*. Both these localities are given in Guillemin & Perrottet's original account of *E. africana* (l.c.), and these specimens are to be regarded as syntypes. In the Herbarium of the Muséum National d'Histoire Naturelle at Paris there are no specimens of *E. africana* from Senegambia collected prior to 1833, a year after the description of *E. africana* was published. The two Geneva specimens show 2–4-jugate pinnae, leaflets in about 10–14 pairs, 1·6–2·6 cm. long and 4–7 mm. wide. Both specimens are young shoots and the leaves most probably not fully mature. The measurements of the leaflets given by Guillemin & Perrottet for *E. africana* are inexplicable and must be due to some error

(as Oliver suspected, see below). The various specimens, both at Paris and Geneva, annotated by Guillemin & Perrottet as *E. africana* are clearly conspecific and leave no doubt of the species intended. Unfortunately I have seen no authentic pods of *E. africana*, so that I can go no further than Oliver did in explaining Guillemin & Perrottet's measurements of these (see below).

Schweinfurth cited as belonging to his *Entada sudanica* specimens from Fesoghlu (*Cienkowski* 252), Nigeria (*Barter* 1056) and Matamma in Gallabat (*Schweinfurth* 1891, 1935). It was described as having 5-6-jugate pinnae, each with 16–20 pairs of leaflets which were 1·5–2 cm. long and 4–5 mm. wide. Schweinfurth noted its close relationship with *E. africana*, but separated it on account of the broader and more numerous, glabrous leaflets, and by the seeds not being " margine prominulo circumscriptum", which is how Guillemin & Perrottet described those of *E. africana*.

Oliver in the Flora of Tropical Africa suggested that the width, $\frac{1}{2}$ line, of the leaflets of *E. africana* as given by Guillemin & Perrottet might be an error for 1–2 lines and that 8 inches given as the *width* of the pod by the latter authors was intended for the length. He distinguished in his key the two species by the following characters :—

Pinnae usually 2-jugate. Leaflets 8–15-jugate, $\frac{1}{3}$–$\frac{1}{2}$ in. long . *E. africana*

Pinnae 5–8-jugate. Leaflets 14–20-jugate, $\frac{1}{2}$–1 in. long . *E. sudanica*

Oliver has been followed by other authors. E. G. Baker, for instance, placed *E. africana* in a group of species with 2–4 pairs of pinnae, and *E. sudanica* in another group with 5 or more pairs of pinnae.

Hutchinson & Dalziel used the shape, length and indumentum of the leaflets, and the presence or absence of indumentum on the inflorescence to keep the two species separate. Both Oliver's and Hutchinson & Dalziel's interpretations of *E. africana* were based partly on the distinct species *E. mannii* (Oliv.) Tisserant, which was confused with *E. africana*.

Aubréville, Fl. Forestière Soudano-Guinéenne, discussed the two species, emphasised their close relationship, and stated that the number of pinna-pairs should be considered the most important character. His key-characters are as follows :—

2–4 pairs of pinnae. 10–20 pairs of leaflets. Leaflets oblong, 2–3 cm. × 6–10 mm. . . . . *E. africana*

5–7 pairs of pinnae. 14–24 pairs of leaflets. Leaflets narrowly oblong, 1·8–2·5 cm. × 3–8 mm. . . . . *E. sudanica*

Aubréville stated also that the two species are muddled in the field, and grow mixed in the same areas.

In order to judge how reliable the alleged characters are, I have tabulated material of *E. africana* and *E. sudanica* in the Kew Herbarium :—

Locality	*Number of pairs of pinae*	*Number of pairs of leaflets*	*Size of leaflets (cm.)*
Nigeria, Zamfara, *Keay* FHI. 16200 ...	(1–) 2–5	15–18	1·3–2·2 × 0·45–0·65
Nigeria, Zamfara, *Keay* FHI. 15644 ...	(1–) 3–6	9–18	1·4–2·1 × 0·4–0·7

Locality	Number of pairs of pinnae	Number of pairs of leaflets	Size of leaflets (cm.)
Gold Coast, Daboya, *McLeod* 820	3	10–12	2·4–3·6 × 1–1·2
Dahomey, *Chevalier* 23549	3	15–18	2·4–3 × 0·75–1
Nigeria, Zamfara, *Keay* FHI. 18069 ...	3–6	17–19	1·5–2·5 × 0·5–0·8
French Cameroons, Bosum *Tessmann* 2256 ...	4	9–11	2·1–3 × 1–1·2
Ubangi, Boma, *Chevalier* 5979	4	10–12	2·1–3 × 0·7–1·2
Ubangi - Shari, Ouaka, *Tisserant* 1076 bis ...	4	10–12	3–4 × 1–1·2
Gold Coast, Tili, *Vigne* 3765	4	13	2–3·4 × 1–1·3
Portuguese Guinea, Buba, *Espírito Santo* 2477 ...	4	13–15	2–3·1 × 0·9–1·05
Anglo - Egyptian Sudan, Boma Plateau, near Towath, *Myers* 10430	4–5	10–15	1·5–2·4 × 0·5–0·8
Anglo - Egyptian Sudan, Nuba Mts., *Simpson* 7772	4–5	16–17	1·5–3·4 × 0·5–1·1
Anglo - Egyptian Sudan, Lado District, *Cartwright* 13	5	12–13	2·6–3·2 × 0·7–0·8
Bongo-land, *Schweinfurth*, ser. II, 93	5	13–15	2·2–3 × 0·6–0·8
Nigeria, Nupe, *Barter* 1122	5	16–17	2–2·6 × 0·75–0·85
Nigeria, Lagos, *McGregor* 244	6–7	16–22	2·3–2·5 × 0·6–0·7
Nigeria, Anara, *Keay* FHI. 21103	7	16–21	1·5–2·5 × 0·45–0·8
Nigeria, Vam, *Dent Young* 87	8	23–24	1–2 × 0·25–0·5
Nigeria, Kaduna, *Lamb* 47	8–9	18–20	1–1·4 × 0·3–0·45
Nigeria, Abinsi, *Dalziel* 607	8–9	23–24	0·9–1·6 × 0·3–0·4

I have arranged the above 20 cited specimens according to the number of pairs of pinnae, those with fewest first. Certain tendencies are clear : those plants with fewest and broadest leaflets tend to have few pinnae, and those plants with most numerous and narrowest leaflets tend to have numerous pinnae. It would be possible, as Aubréville and others have

done, to use the number of pinnae as the main criterion for splitting the complex, but at whatever point this is done, the resulting groups would widely overlap each other both in number of pairs of leaflets and their size. I am driven to the conclusion, therefore, that it is not justified to recognise more than one species here, and that, without further careful work in the field, it would be premature to attempt to define varieties.

Chevalier 5979, cited above, is an isotype of *Entada ubanguiensis* De Wild., which must also be considered synonymous.

Entada spinescens *Brenan*, sp. nov. ; e grege *E. wahlbergii* Harv. et *E. stuhlmannii* (Taub.) Harms, ab ambabus caulibus saltem juvenilibus petiolis rhachidibus foliorum axibus inflorescentiarum plus minusve pubescentibus vel puberulis, stipulis divaricatis subconicis spinescentibus differt ; praeterea ab illa pedicellis paulum brevioribus, filamentis staminum brevioribus, ab hac foliolis numerosioribus, nervis lateralibus venisque subtus non vel vix cernendis distincta.

Frutex gracilis, scandens, usque ad 3·6 m. altus vel ultra, stipulis exceptis inermis. *Caules* juventute tenues, saepe flexuosi, pubescentes vel puberuli, siccitate purpurei vel brunnei, longitudinaliter sulcato-striati, serius glabrescentes. *Folia* : petiolus et rhachis pubescentes vel puberuli, illus 2–5·5 cm. longus, hic 1·5–3·3 cm. longus, ultra par terminale pinnarum in appendiculum 2–3·5 mm. longum desinens ; pinnae 1–2-jugae, 2·8–6 cm. longae, rhachidibus pubescentibus vel puberulis, quarum una vel plures saepe basi spiraliter torta vel pampinata ; foliola 12–17-juga, elongato-oblonga, plerumque 1–1·8 cm. longa et 2–4 mm. lata (infima minora, nonnunquam tantum 4 mm. longa et 1 mm. lata), apice mucronata rotundata vel obtusa, basi asymmetrica latere proximo subtruncato vel abrupte cuneato latere distali fere recto, glabra vel nonnunquam costa marginibusque pilis paucis, subtus glaucescentia, nervis lateralibus venisque non vel vix cernendis ; stipulae divaricatae, rigidae, subconicae, spinescentes, plus minusve pubescentes, 1·5–3·5 mm. longae. *Racemi* axillares, solitarii, 3–5 cm. longi, 1·5–3 cm. longe pedunculati, pedunculo velut axi inflorescentiae plus minusve pubescenti vel puberulo. *Bracteae* lineari-lanceolatae, 1–1·5 (–2) mm. longae, attenuato-acutae. *Pedicelli* 0·25–0·5 mm. longi, glabri. *Calyx* glaber, circiter 1 mm. longus, apice circiter 1·2 mm. diametro, 5-dentato, dentibus triangularibus acutis 0·3–0·4 mm. longis basi 0·5 mm. latis. *Petala* parte libera oblongo-elliptica acuta 3 mm. longa 1·2 mm. lata, cacumine non deflexo. *Staminum* filamenta 3–3·5 mm. longa ; antherae elliptico-subquadratae, 0·8–1 mm. longae, 0·7 mm. latae, glandulis caducissimis. *Ovarium* glabrum, stylo circiter 3 mm. longo. *Legumina* plana, subcoriacea, falcata, circiter 13–17 cm. longa, 3–3·8 cm. lata, brunnea vel griseo-brunnea, tenuiter venosa, margine conspicue crenata, stipite 2·5–3·8 cm. longo. *Semina* (nondum matura) circiter 8 mm. longa, 5 mm. lata.

Tanganyika Territory. Central Province, Dodoma District : Dodoma to Dodoma Hill, 11 Dec. 1925, *Peter* 33060 :—slender liane ; fruit a flat jointed pod, breaking up. Manyoni–Kilimatinde road, 1220 m., 16 Dec. 1935, *Burtt* 5389 :—broken thicket on side of escarpment ; climbing plant to 3·6 m. or more, very local. Mpwapwa District. Mpwapwa, 1070 m., 13 Dec. 1931, *Hornby* 398 :—trailing plant over trees on brown soil in deciduous scrub, not common. Mpwapwa, 25 Apr. 1932, *Burtt* 3611. Mpwapwa, 910–1220 m., 2 Mar. 1937, *Hornby* 398 :—creeper over trees in deciduous thicket. Near Gulwe, 1070 m., 22 Jan. 1933, *Burtt* 4639 (holotypus in Herb. Kew.) :—climbing plant to 2·1 m., fairly frequent in *Commiphora-Cordyla* thicket.

The description of the flowers, whose colour is not noted but which, judging from the dried specimens and from what is known of *E. wahlbergii* and *E. stuhlmannii*, is probably deep reddish or purple, is taken from the type. The pods are described from *Hornby* 398.

Entada wahlbergii *Harv.* in Harv. et Sond., Fl. Cap. **2,** 277 (1862).

Pusaetha wahlbergii (Harv.) O. Ktze., Rev. Gen. **1,** 204 (1891).

Entada flexuosa Hutch. et Dalz., Fl. W. Trop. Afr. **1,** 356 (July 1928); in Kew Bull. **1928,** 401 (Dec. 1928).

Hutchinson and Dalziel (*l.c.*, Dec. 1928) distinguished their new species, *E. flexuosa*, from *E. wahlbergii* by the more numerous and narrower leaflets, and by the less toothed calyx. The greater amount of material now available indicates that these distinguishing characters are not satisfactory, especially when East African specimens are considered, and that *E. flexuosa* and *E. wahlbergii* are both members of a single variable complex. The components of this complex might be looked upon as incipient species, whose divergence through evolution has not yet gone far enough for them to be recognised as such. It is interesting that Harvey (*l.c. supra*) noted the similarity and possible identity of his *E. wahlbergii* with *Barter* 991 (Nigeria, Nupe), at that time unnamed, but later to be made the holotype of *E. flexuosa*.

I am grateful to the authorities of the Naturhistoriska Riksmuseum at Stockholm for kindly sending on loan the holotype of *E. wahlbergii* (Cape of Good Hope, *Wahlberg s.n.*).

In West Tropical Africa, from Portuguese Guinea to Nigeria, typical *E. flexuosa* occurs (5 gatherings examined) with (10–) 12–17 pairs of leaflets per pinna 1·5–2·5 mm. wide, and calyx-teeth 0·4–0·75 mm. deep.

In Uganda (4 gatherings examined) plants occur with 10–17 pairs of leaflets per pinna 2–3·8 mm. wide, and calyx teeth 0·4–0·8 mm. deep.

In the Anglo-Egyptian Sudan (3 gatherings examined) there are 12–17 pairs of leaflets per pinna 1·5–3 mm. wide, and calyx-teeth 0·3–0·7 mm. deep.

In South Africa (4 gatherings examined) plants occur with 9–12 pairs of leaflets per pinna 2·5–4·5 mm. wide and calyx-teeth 0·3–0·75 mm. deep.

The figures given above show how the numbers of pairs and breadth of the leaflets overlap in different areas, and that the alleged calyx-teeth character of *E. flexuosa* (*supra*) is non-existent.

There are however certain other significant characters, and taking these into account, we can sort the complex provisionally into three entities, for which the letters A. B and C are used :—

A. (*E. wahlbergii* Harv., *sensu stricto*). Confined to Natal. Leaflets comparatively few, 9–12 pairs per pinna, 2·5–4·5 mm. wide. Pedicels about 1·5 mm. long. Petals about 3·5 mm. long, with a minute appendage at apex bent inwards and downwards.

B. Uganda, Belgian Congo and ? Anglo-Egyptian Sudan. Leaflets usually more numerous than in A, 10–18 pairs per pinna, 2–3·8 mm. wide. Pedicels about 1 mm. long. Petals 3·25–3·5 mm. long, not appendaged at apex.

C. (*E. flexuosa* Hutch. et Dalz.). French Guinea to Nigeria ; Anglo-Egyptian Sudan. Leaflets usually more numerous than in A, 10–17 pairs per pinna, 1·5–2·5 mm. wide. Pedicels about 1 mm. long. Petals about 3 mm. long, mostly appendaged as in A.

At present, until these entities can be tested, I consider it better not to name them, but merely to place them on record.

It will be noticed that there is a considerable geographical gap in East Africa between the areas occupied by A and B. However, there are at Kew two gatherings from Northern Rhodesia. One, *Michelmore* 447, has flowers but no leaves ; the petals are sometimes slightly appendaged at apex, sometimes not—evidence indicating that this character is not of great taxonomic value. The other, *Bullock* 1168, has pods and some fragmentary leaves. The leaflets are up to 24 pairs per pinna and only about 1 mm. wide. This may perhaps be a distinct species, but the material is altogether insufficient.

Entada stuhlmannii (*Taub.*) *Harms* in Engl. et Drude, Veg. Erde, **9,** Pflanzenw. Afr. **3** (**1**), 401 (1915) ; Bak. f., Leg. Trop. Afr. 788 (1930).

Pusaetha stuhlmannii Taub. in Pflanzenw. Ost-Afr. **C,** 196 (1895).

[*Entada wahlbergii* (non Harv.)—Bak. f., Leg. Trop. Afr. 788 (1930)].

Pusaetha stuhlmannii was based on five *Stuhlmann* numbers from the coast of Tanganyika, all now apparently destroyed. Taubert's description mentions various features, however, that enable the identity of his species to be fixed. It is clear that *E. stuhlmannii* is related, as Taubert pointed out, to *E. wahlbergii*, and also to the new species, *E. spinescens*, described on p. 168. The most significant point of the description of *P. stuhlmannii* is " foliolis . . . . . utrinque reticulatis " ; in both *E. wahlbergii* and *E. spinescens* the lateral nerves and venation of the leaflets are almost or quite invisible beneath. The leaflets of *P. stuhlmannii* are also described as 5–7-jugate, while they 9–18- and 12–17-jugate respectively in the other two species. The description of *P. stuhlmannii* as " glaberrimus " also separates it from *Entada spinescens*.

There can be no doubt that *Entada stuhlmannii* is a distinct species known so far only from the coast of Tanganyika and Portuguese East Africa. It is unfortunate that Baker in his Leguminosae of Tropical Africa based his account of *E. wahlbergii* on a gathering of *E. stuhlmannii*, an error that has resulted in unnecessary confusion between these two species.

The following specimens are referable to *E. stuhlmannii* :—

Tanganyika Territory. Rufiji District, 15 m., 17 Jan. 1931, *Musk* 117. Lindi District. Mtange, 23 Mar. 1943, *Gillman* 1383. Mikindani District (or ? Portuguese East Africa). Rovuma R., 48 km. from coast, 16 Mar. 1861, *Meller s.n.*

Portuguese East Africa. Msalu R., 12 Jan., *Allen* 157.

Piptadenia and Related Genera.

E. G. Baker, Leg. Trop. Afr. 790–95 (1930), recognised fifteen species of *Piptadenia* ; he noted that the seeds were various in their position and structure, but thought that it was " inadvisable to keep the genus *Newtonia* separate from *Piptadenia* ". The genus *Newtonia* had been

founded long before by Baillon, mainly on account of its remarkable winged seeds. Very recently, Gilbert & Boutique, in Fl. Congo Belge, **3** (1952), have taken a different view from that of Baker ; Belgian Congo species included in *Piptadenia* by Baker are here distributed between *Newtonia* and *Aubrevillea* Pellegr., leaving *Piptadenia africana* Hook. f. alone in *Piptadenia*. In connection with the Flora of Tropical East Africa it has been necessary to decide which of these views, if either, was correct. Clearly one of the first things to be done was to decide what is the type of *Piptadenia*.

The Typification of Piptadenia. Bentham founded the genus *Piptadenia* in 1841, placing under it 25 species, all American and mostly Brazilian. 17 species were placed in the Section *Eupiptadenia*, and it is from among these that the lectotype-species should be chosen. There have been two different lectotype-species proposed for *Piptadenia*. Britton & Rose, in N. Amer. Fl,. **23,** 189 (1928), proposed *P. latifolia* Benth. as the type. This choice was challenged by Burkart, in Darwiniana **9,** 77–8 (1949), firstly because Britton & Rose seem to have chosen *P. latifolia* merely because it stood first in Bentham's enumeration of the species in 1841, and secondly because Burkart discovered that the seeds of *P. latifolia* have endosperm, and though Bentham in 1841 did not mention endosperm in his generic description of *Piptadenia*, it is evident from his later remarks (see, e.g. pp. 366 and 372 in Trans. Linn. Soc. **30** (1875)) that he considered that true *Piptadenia* species should have seeds without endosperm, and indeed in 1875 (*op. cit.*, p. 358) he used the absence of endosperm as the main character to separate the tribe *Piptadenieae* from the tribe *Adenanthereae*. Burkart proposed therefore that *P. latifolia* should not be accepted as the lectotype-species of *Piptadenia*, but that *P. rigida* Benth. should be chosen instead. A further objection to Britton & Rose's choice is that Bentham based *Piptadenia* mainly on fruit characters, and in 1841 Bentham had not seen pods or seeds of *P. latifolia* ; he had however seen and described the pods and seeds of *P. rigida*, which he placed in the Section *Eupiptadenia*. There is no reason to doubt that Bentham considered *P. rigida* a thoroughly typical *Piptadenia*, and Burkart's selection of *P. rigida* Benth. as the type-species of *Piptadenia* must therefore be followed.

The Limits of Piptadenia. Bentham in 1841 split *Piptadenia* into three sections. Of these *Niopa* was separated from the other two by globose not spicate inflorescences ; of the others *Eupiptadenia* had the valves of the pod continuous, thin and smooth or reticulate, while *Pityrocarpa* had the pod contracted between the seeds and glandular-leprose. Examination of material shows that *Niopa* is a natural group, but that the species placed in the other two sections are very mixed, and cannot be grouped in the way that Bentham proposed.

The flowers of many genera of *Mimosoideae* are so similar that it seems reasonable to follow the principle of other writers on the group, Bentham included, and to lay especial emphasis on the pod. Within *Piptadenia*, in the widest sense in which it has been taken, the pod shows great variation, both in texture, direction and mode of dehiscence. The pods of some species dehisce along both sutures, while in others the valves remain attached to one another along one suture. The structure of the

seeds of different species is also astonishingly different : some are small, hard, lenticular with obtuse margins, and possess endosperm, while others are nearly flat, broadly winged, and without endosperm. The pod and seed differences are of such importance that they seem comparable with those that have been used elsewhere in the *Mimosoideae* to separate genera, and as they are here not infrequently correlated with other vegetative differences, it seems unnatural to maintain the concept of *Piptadenia sensu latissimo*, and the following revised scheme is therefore proposed.

Keys to Piptadenia and related genera. I have endeavoured to construct two keys, one based primarily on the characters of pods and seeds, the other on flowers and foliage. The latter key must be used with the greatest caution, and in the knowledge that the range of variation, as far as foliage is concerned, is still doubtless imperfectly known in most of the genera.

I have included in the key five tropical African genera whose distinctness has not been called in question, but which are very closely related to *Piptadenia, sensu latissimo*, and whose relationship with the segregates proposed here needs to be clarified. These genera are not included in the enumeration that follows the keys. They are as follows :—

Aubrevillea Pellegr. in Bull. Soc. Bot. France, **80,** 466 (1930).

Calpocalyx Harms in Engl. et Prantl, Nat. Pflanzenf., Nachtr. **1,** 191 (1897). See p. 183.

Cylicodiscus Harms in Engl. et Prantl, Nat. Pflanzenf., Nachtr. **1,** 192 (1897).

Fillaeopsis Harms in Engl., Bot. Jahrb. **26,** 258 (1899).

Pseudoprosopis Harms in Engl., Bot. Jahrb. **33,** 152 (1902). See p. 183.

A. Key based primarily on pods and seeds.

Pod indehiscent, papery, flat, samaroid ; seeds flat, acutely margined but unwinged, without endosperm . . . . . *Aubrevillea* Pellegr.

Pod dehiscent along one or both sutures :

Dehiscence along both sutures :

Valves of pod woody, spirally twisted or recurving after dehiscence ; pod usually conspicuously attenuate below, usually thus broader in upper part ; seeds not winged, without endosperm :

Pinnae in one pair per leaf, rhachis glandular at their insertion ; medium or large trees . . . . . *Calpocalyx* Harms

Pinnae of most leaves in 2 or more pairs ; rhachis eglandular ; shrubs or lianes, sometimes small trees . *Pseudoprosopis* Harms

Valves papery to coriaceous but not woody, and not spirally twisted or recurved after dehiscence ; pods mostly oblong to linear:

Seeds obtusely or sometimes subacutely margined, lenticular, never winged, isodiametric or slightly longer than wide, usually hard, with endosperm . . 1. *Pityrocarpa* (Benth.) Britton et Rose

Seeds broadly or sometimes narrowly winged, flattened, thin, brown, often elongate, without endosperm :

Pods very large, at least 10 cm. wide ; seeds very large, oblong, broadly winged, lying transversely in the pod, the radicle parallel with the sutures ; valves coriaceous
Fillaeopsis Harms

Pods much smaller, at most 3 cm. wide ; radicle at right angles to the sutures :

Seeds broadly winged at either side, thus oblong or oblong-elliptic ; valves flat ; long axis of seeds lying parallel to sutures ; leaflets 1-jugate : India
4. *Indopiptadenia* Brenan

Seeds narrowly winged, subcircular to very shortly elliptic ; valves ± transversely plicate ; leaflets multijugate ; Brazil . . . . . 3. *Piptadenia* Benth.

Dehiscence along one suture only, the valves remaining attached along the other :

Seeds obtusely margined, never winged, lenticular, pale grey, with endosperm ; valves thick, coriaceous
2. *Goldmania* Rose ex Micheli

Seeds acutely margined or ± winged, strongly flattened, brown, without endosperm :

The seeds large, conspicuously winged, oblong or oblong-elliptic, either much longer than wide or *vice versa* :

Funicle attached at or near one end of the seed ; the cotyledons elongate :

Leaflets alternate ; indumentum stellate . *Cylicodiscus* Harms

Leaflets opposite ; indumentum not stellate
7. *Newtonia* Baill.

Funicle attached at or near the middle of the seed ; the cotyledons wider than long . . 6. *Piptadeniastrum* Brenan

The seeds much smaller, narrowly or not winged, suborbicular or shortly elliptic ; America only :

Pod ± straight, but the valves twisted at intervals, deeply constricted between the seeds ; inflorescence spicate ; leaf-rhachis with glands between pinna-pairs
5. *Monoschisma* Brenan

Pod straight, valves not twisted ; inflorescence capitate ; leaf-rhachis without glands between pinna-pairs
8. *Anadenanthera* Speg.

B. Key based primarily on flowers and leaves.

Leaflets alternate, ovate or ovate-elliptic :

Indumentum stellate ; flowers pedicellate, calyx and corolla puberulous outside ; stamens with smooth filaments inserted on the side of a thin but conspicuous disc . . . . *Cylicodiscus* Harms

Indumentum not stellate ; flowers sessile, glabrous outside ; stamens with densely papillose filaments inserted on the outside of a low thick disc . . . . . *Fillaeopsis* Harms

Leaflets opposite :

Flowers in globose heads ; ovary sessile . . 8. *Anadenanthera* Speg.

Flowers in spikes or racemes :

Prickles present, at least on older branchlets
1. *Pityrocarpa* (Benth.) Britton et Rose

Prickles absent :

Leaflets in 1 (sometimes 2) pairs :

Corolla glabrous outside :

Leaflets very broadly rounded at apex
4. *Indopiptadenia* Brenan

Leaflets narrowed at apex to an obtuse point
Monoschisma inaequale (Benth.) Brenan (p. 179)

Corolla and calyx puberulous outside :

Anthers (even in bud) eglandular at apex
Newtonia paucijuga (Harms) Brenan (p. 181)

Anthers, at least in bud, glandular at apex :

Leaflets rounded at apex, ± obovate, rather small ; leaves ± deciduous . 2. *Goldmania* Rose ex Micheli

Leaflets ± pointed at apex, elliptic, rather large ; leaves evergreen . *Newtonia duparquetiana* (Baill.) Keay (p. 180)

Leaflets in 3 to many pairs :

Corolla (and usually calyx) ± puberulous outside :

Petiole with a sessile gland on its upper side above the base
1. *Pityrocarpa* (Benth.) Britton et Rose

Petiole without a sessile gland, though glands may be present between the pairs of pinnae :

Leaflets ± acuminate, ovate to oblong ; pinnae in 1–2 pairs :

Flowers sessile ; petals united below into a tube $\frac{1}{3}$–$\frac{1}{2}$ or more as long as corolla ; medium or large trees ; pinnae in one pair per leaf . . *Calpocalyx* Harms

Flowers pedicellate ; petals free or almost so ; shrubs or lianes, sometimes small trees ; pinnae of most leaves 2 pairs . . . . *Pseudoprosopis* Harms

Leaflets not acuminate :

Ovary pubescent outside :

Flowers sessile or almost so ; leaf-rhachis usually glandular between pairs of pinnae ; medium or large trees . . . . . 7. *Newtonia* Baill.

Flowers pedicellate ; leaf-rhachis eglandular ; shrubs or lianes, sometimes small trees
Pseudoprosopis Harms

Ovary glabrous outside :

Flowers pedicellate . . . . *Aubrevillea* Pellegr.

Flowers sessile . 1. *Pityrocarpa* (Benth.) Britton et Rose

Corolla (and usually calyx) glabrous outside :

Petiole with a sessile gland on its upper side above its base

*3. *Piptadenia* Benth.
1. *Pityrocarpa* (Benth.) Britton et Rose

Petiole without a sessile gland on its upper side
6. *Piptadeniastrum* Brenan

Descriptions of the genera.

As stated on p. 172, the genera *Aubrevillea*, *Calpocalyx*, *Cylicodiscus*, *Fillaeopsis* and *Pseudoprosopis* are not included in the following enumeration.

I have transferred on the following pages to their appropriate genera those species of which adequate material, including pods and seeds, has been available to me. The pods and seeds, however, of many species described under *Piptadenia* are still unknown. Although it is often possible to guess to what genus they should be referred, it seems obviously preferable to leave them under *Piptadenia* to await fuller evidence of their real position. It is therefore not intended here to give a revision of the species under each genus, a task that must await further work.

1. **Pityrocarpa** (*Benth.*) *Britton et Rose* in N. Amer. Fl. **23,** 190 (1928), *hic emend. et amplif.*

Piptadenia Benth. Sect. *Pityrocarpa* Benth. in Hook., Journ. Bot. **4,** 339 (1841).

Plerumque arbores vel frutices, raro scandentes, saepissime aculeis saltem in caulibus vel stipulis spinosis armati, raro inermes. Folia : petiolus supra basim vel raro apicem versus glandula ornatus ; rhachis inter pinnas glandulosus vel eglandulosus ; pinnae oppositae ; foliola pluri- vel multijuga. Flores spicati. Calyx et corolla extra glabra vel puberula, lobis corollae fere usque ad basim liberis vel plus minusve tubulosis. Stamina tantum imo basi brevissime connata. Discus minimus vel subnullus. Ovarium glabrum vel pubescens, stipitatum. Legumina recta vel leviter curvata, secundum ambos margines dehiscentia, valvis rigide papyraceis vel subcoriaceis, aut complanatis transverse plicatis marginibus rectis, aut moniliformibus inter semina profunde constrictis. Semina lenticularia, margine obtusa vel nonnunquam subacuta, nullo modo alata, albuminosa, breviter elliptica vel suborbicularia. Distr. : Amer. centr. et austr.

* At this stage in the key the numerous and important pod and seed differences must be used to separate *Piptadenia* and *Pityrocarpa*. See Key A, and the generic descriptions.

A. Sect. **Pityrocarpa.** Valvi satis tenues, subcoriacei, inter semina profunde constricti.

Pityrocarpa constricta (*Micheli et Rose*) *Britton et Rose* in N. Amer. Fl. **23,** 190 (1938).

Goldmania constricta Micheli et Rose in Mém. Soc. Phys. Hist. Nat. Genève, **34,** 274 (1903).

Piptadenia constricta (Micheli et Rose) Macbr. in Contrib. Gray Herb., n.s., **59,** 18 (1919).

Pityrocarpa obliqua (*Pers.*) *Brenan,* comb. nov.

Sophora obliqua Pers., Syn. Pl. **1,** 452 (1805).

Piptadenia moniliformis Benth. in Hook., Journ. Bot. **4,** 339 (1841) ; *typus generis.*

Piptadenia obliqua (Pers.) Macbr. in Contrib. Gray Herb., n.s., **59,** 17 (1919) ; Burkart in Darwiniana, **9,** 83 (1949).

B. Sect. **Orthocraspedon** *Brenan,* sect. nov. Valvi rigide papyracei, complanati, transverse plicati, marginibus rectis. Typus sectionis : *Pityrocarpa flava* (Spreng. ex DC.) Brenan, *vide infra.*

Pityrocarpa adiantoides (*Spreng.*) *Brenan,* comb. nov.

Acacia adiantoides Spreng., Syst. **3,** 146 (1826).

Mimosa fruticosa Vell., Fl. Flum. **11,** t. 6 (1835).

Piptadenia laxa Benth. in Hook., Journ. Bot. **4,** 335 (1841), *nom. illegit.*

Piptadenia adiantoides (Spreng.) Macbr. in Contrib. Gray Herb., n.s., **59,** 17 (1919).

Pityrocarpa flava (*Spreng. ex DC.*) *Brenan,* comb. nov.

Acacia flava Spreng. ex DC., Prodr. **2,** 469 (1825) ; Spreng., Syst. **3,** 141 (1826).

Piptadenia flava (Spreng. ex DC.) Benth. in Trans. Linn. Soc. **30,** 371 (1875).

Piptadenia leptocarpa Rose in Contrib. U.S. Nat. Herb. **I,** 325 (1895).

Pityrocarpa fruticosa (*Mart.*) *Brenan,* comb. nov.

Acacia fruticosa Mart. in Flora, **20,** Beibl. 107 (1837).

Piptadenia latifolia Benth. in Hook., Journ. Bot. **4,** 335 (1841), *nom. illegit.*

Piptadenia fruticosa (Mart.) Macbr. in Contrib. Gray Herb., n.s., **59,** 17 (1919).

Pityrocarpa gonoacantha (*Mart.*) *Brenan,* comb. nov.

Acacia gonoacantha Mart. in Flora, **20,** Beibl. 109 (1837).

Piptadenia communis Benth. in Hook., Journ. Bot., **4,** 337 (1841).

Piptadenia gonoacantha (Mart.) Macbr. in Contrib. Gray Herb., n.s., **59,** 17 (1919).

Pityrocarpa paniculata (*Benth.*) *Brenan*, comb. nov.

Piptadenia paniculata Benth. in Hook., Journ. Bot. **4,** 338 (1841).

Pityrocarpa pteroclada (*Benth.*) *Brenan*, comb. nov.

Piptadenia pteroclada Benth. in Trans. Linn. Soc. **30,** 370 (1875).

Pityrocarpa stipulacea (*Benth.*) *Brenan*, comb. nov.

Piptadenia communis Benth. var. *stipulacea* Benth. in Mart., Fl. Bras. **15** (**2**), 279 (1876).

Piptadenia stipulacea (Benth.) Ducke in Arch. Bot. Rio de Janeiro, **5,** 126 (1930).

Pityrocarpa trisperma (*Vell.*) *Brenan*, comb. nov.

Mimosa trisperma Vell., Fl. Flum. **11,** t. 40 (1835).

Piptadenia trisperma (Vell.) Benth. in Hook., Journ. Bot. **4,** 337 (1841).

Pityrocarpa viridiflora (*Kunth*) *Brenan*, comb. nov.

Acacia viridiflora Kunth, Mimos. et autr. pl. Légum. 81, t. 25 (1821).

Piptadenia viridiflora (Kunth) Benth. in Hook., Journ. Bot. **4,** 337 (1841).

Piptadenia biuncifera Benth. in Hook., Journ. Bot. **4,** 337 (1841), *syn. prob. fide* Burkart in Darwiniana **9,** 78 (1949).

The Section *Pityrocarpa* corresponds to the genus *Pityrocarpa* as defined by Britton & Rose in N. Amer. Fl. **23,** 190 (1928), while Section *Orthocraspedon* corresponds to what they considered as the separate genus *Piptadenia*. There seems no other character than whether the pod is constricted or not to separate these, and I consider them best treated as sections of a single genus.

Pityrocarpa, as defined here, is very uniform (except in the character mentioned above) in its pods and seeds, but is vegetatively variable. It is however very noteworthy that all the species of *Piptadenia* in its old sense possessing spines or prickles, whose fruits I have seen, belong to *Pityrocarpa*.

If Britton & Rose's choice, with which I disagree, of *Piptadenia latifolia* Benth. as the type-species of *Piptadenia* were accepted, then *Piptadenia* would have to be the name for the genus here called *Pityrocarpa*.

2. **Goldmania** *Rose ex Micheli* in Mém. Soc. Phys. Hist. Nat. Genève, **34,** 274 (1903).

Arbores parvae, sine aculeis sed ramulis apice nonnunquam spinescentibus. Folia : petiolus eglandulosus (i.e. sine glandula majore ut in *Pityrocarpa*) ; rhachis inter pinnas glandulosus ; foliola unijuga (raro bijuga). Flores spicati. Calyx necnon corolla extra puberula. Corolla longe tubulosa, a staminibus discoque libera. Discus minimus. Ovarium extra puberulum vel pubescens, stipitatum. Legumina plus minusve falcato-curvata, secundum unum marginem tantum dehiscentia, valvis crassis coriaceis haud vel vix inter semina constrictis. Semina lenticularia, margine obtusa, nullo modo alata, albuminosa, pallide grisea, suborbicularia vel parum irregularia. Distr. : Mexico et Amer. austr.

Goldmania platycarpa *Rose ex Micheli* in Mém. Soc. Phys. Hist. Nat. Genève, **34,** 274 (1903) ; Britton et Rose in N. Amer. Fl. **23,** 190 (1928) ; *typus generis.*

Goldmania paraguensis (*Benth.*) *Brenan*, comb. nov.

Pithecolobium paraguense Benth. in Trans. Linn. Soc. **30,** 574 (1875).

Piptadenia paraguensis (Benth.) Lindm. in Bih. Svensk. Vet.-Akad. Handl. **24,** no. 7, 36 (1898) (ut " paraguayensis ").

This species is very closely related indeed to *G. platycarpa*. *Piptadenia quadrifolia* N. E. Br., in Trans. Bot. Soc. Edinb. **20,** 53 (1894), does not seem separable from *G. paraguensis*.

Goldmania is most closely related to *Pityrocarpa*, but differs in the pods dehiscing down one suture only, their valves thick and coriaceous, the eglandular petioles, and the leaflets in only one, or rarely two, pairs.

3. **Piptadenia** *Benth.* in Hook., Journ. Bot. **4,** 334 (1841), *hic emend. et restrict.*

Arbores inermes. Folia : petiolus supra basim glandulo ornatus ; rhachis eglandulosus ; pinnae oppositae vel fere oppositae ; foliola multijuga. Flores spicati. Calyx extra puberulus. Corolla extra glabra. Discus parvus, valde inconspicuus, cum imo basi corollae tubi consolidatus. Ovarium extra glabrum, stipitatum. Legumina recta, secundum ambos margines dehiscentia, valvis subcoriaceis complanatis transverse plicatis, haud vel leviter tantum inter semina constrictis. Semina complanata, margine plus minusve anguste alata, exalbuminosa, irregulariter elliptica, brunnea ; cotyledona oblique dilatata, plerumque paulum latiora quam longa ; funiculus oblique in medio seminis affixus. Distr. : Amer., austr.

Piptadenia pterosperma *Benth.* in Hook., Journ. Bot., **4,** 338 (1841).

Piptadenia rigida *Benth.* in Hook., Journ. Bot. **4,** 338 (1841) ; *lectotypus generis.*

See note under *Indopiptadenia* (p. 179).

4. **Indopiptadenia** *Brenan*, gen. nov.

Habitus ignotus, sed planta ut videtur inermis. Folia : petiolus eglandulosus ; rhachis inter pinnas glandulosus ; pinnae oppositae ; foliola unijuga. Flores spicati. Calyx (marginibus loborum exceptis) corollaque extra glabra. Corollae lobi usque ad basin liberi. Discus inconspicuus, cum corollae basi consolidatus. Ovarium extra glabrum, breviter stipitatum. Legumina leviter curvata vel recta, secundum ambos margines dehiscentia, valvis subcoriaceis complanatis haud transverse plicatis, marginibus rectis. Semina plana, ala membranacea praesertim utrinque circumclusa, hinc semina plus minusve oblongo-elliptica, exalbuminosa, brunnea ; cotyledona dilatata, latiora quam longa ; funiculus in medio seminis affixus. Distr. : India.

Indopiptadenia oudhensis (*Brandis*) *Brenan*, comb. nov. ; *typus generis*.

Piptadenia oudhensis Brandis, For. Fl. N.-W. & Centr. India, 168 (1874).

Among the genera with exalbuminous winged seeds, *Indopiptadenia* appears closest to *Piptadenia* itself, with which it shares the character of the pods dehiscing along both sutures. *Indopiptadenia* differs, however, in the elongate seeds, the eglandular petiole, the glandular rhachis, the unijugate leaves, and the corolla-lobes being free to their base.

5. **Monoschisma** *Brenan*, gen. nov.

Arbores inermes. Folia : petiolus eglandulosus ; rhachis saltem inter aliquae paria pinnarum glandulosus ; pinnae plerumque oppositae ; foliola 1- usque plurijuga. Flores spicati. Calyx extra puberula usque subglabra. Corolla extra glabra, lobis usque ad basin liberis. Discus valde inconspicuus, cum corollae basi consolidatus. Ovarium extra glabrum usque puberulum, breviter stipitatum. Legumina recta vel plus minusve curvata, secundum alterum marginem dehiscentia, secundum alterum valvis conjunctis, valvis ipsis tortis coriaceis complanatis inter semina profunde constrictis. Semina plana, margine plus minusve anguste alata, exalbuminosa, suborbicularia vel breviter elliptica, brunnea ; cotyledona fere tam lata quam longa, haud elongata ; funiculus oblique in medio seminis affixus. Distr. : Amer. austr.

Monoschisma inaequale (*Benth.*) *Brenan*, comb. nov.

Piptadenia inaequalis Benth. in Hook., Journ. Bot. **4,** 339 (1841).

Monoschisma leptostachyum (*Benth.*) *Brenan*, comb. nov. ; *typus generis*.

Piptadenia leptostachya Benth. in Hook., Journ. Bot. **4,** 339 (1841).

Monoschisma seems more closely related to *Anadenanthera* than to the other genera, especially as far as the pods and seeds are concerned. *Anadenanthera* differs from *Monoschisma* in having capitate inflorescences, seeds not winged, glandular petioles, eglandular rhachides, corolla-lobes connate to high up, etc.

6. **Piptadeniastrum** *Brenan*, gen. nov.

Arbor, alta, inermis. Folia ; petiolus rhachisque eglandulosi ; pinnae saepe alternae ; foliola multijuga. Flores in racemis spiciformibus. Calyx extra basi excepto necnon corolla glaber. Ovarium extra glabrum, sessile vel subsessile. Flores aliter ut in *Newtonia* (p. 180). Legumina recta vel plus minusve curvata, secundum alterum marginem dehiscentia, secundum alterum valvis conjunctis, valvis valde coriaceis complanatis nec transverse plicatis nec inter semina constrictis. Semina complanata, ala lata membranacea circumclusa, plus minusve oblonga, exalbuminosa, brunnea ; cotyledona dilatata, latiora quam longa ; funiculus in vel prope medio seminis affixus. Distr. : Afr. trop.

Piptadeniastrum africanum (*Hook. f.*) *Brenan*, comb. nov. ; *typus generis*.

Piptadenia africana Hook. f., Nig. Fl. 330 (1849).

Piptadeniastrum corresponds with *Piptadenia* as defined by Gilbert & Boutique in Fl. Congo Belge, **3,** 224 (1952).

In the form of the pod, its dehiscence, and the outline of the seeds *Piptadeniastrum* resembles *Newtonia*, but the structure of the seeds and the way they are borne are so different in the two, and coupled with important vegetative and floral differences, that there is ample justification for keeping them as separate genera.

7. **Newtonia** *Baill.* in Bull. Soc. Linn. Par. **1,** 721 (1888).

Arbores inermes, saepe altae. Folia : petiolus eglandulosus vel nonnunquam glandulosus ; rhachis saepius sed non semper glandulosus ; pinnae oppositae ; foliola uni- usque multijuga. Flores in racemis spiciformibus vel spicis. Calyx necnon corolla extra pubescens vel puberula. Discus ut videtur cum basi corollae tubi consolidatus. Ovarium extra pilosum vel puberulum, stipitatum (nonnunquam breviter). Legumina recta vel plus minusve curvata, secundum alterum marginem dehiscentia, secundum alterum valvis conjunctis, valvis ipsis non tortis coriaceis complanatis nec transverse plicatis nec inter semina constrictis. Semina complanata, ala membranacea conspicua circumclusa, oblonga, exalbuminosa, brunnea ; cotyledona elongata, longiora quam lata ; funiculus in vel prope extremum seminis affixus. Distr. : Afr. trop et Amer. austr.

The type-species of *Newtonia* is *N. insignis* Baill., *l.c. supra*, now considered a synonym of *N. duparquetiana* (Baill.) Keay.

A. *Species africanae*

Newtonia aubrevillei (*Pellegr.*) *Keay* in Kew Bull. **1953,** 488 (1954).

Piptadenia aubrevillei Pellegr. in Bull. Soc. Bot. France, **80,** 466 (1933).

Newtonia buchanani (*Bak.*) *Gilbert et Boutique* in Fl. Congo Belge, **3,** 213 (1952).

Piptadenia buchanani Bak. in Kew Bull. **1894,** 354 (1894).

Newtonia duparquetiana (*Baill.*) *Keay* in Kew Bull. **1953,** 488 (1954).

Entada ? *duparquetiana* Baill. in Adansonia, **6,** 210 (1866).

For further synonymy see Keay (*l.c.*).

Newtonia elliotii (*Harms*) *Keay* in Kew Bull. **1953,** 488 (1954).

Piptadenia ? *elliotii* Harms in Engl., Bot. Jahrb. **26,** 260 (1899).

Newtonia erlangeri (*Harms*) *Brenan*, comb. nov.

Piptadenia erlangeri Harms in Engl., Bot. Jahrb. **33,** 151 (1902).

Newtonia griffoniana (*Baill.*) *Bak. f.* in Journ. Bot. **66,** suppl. I, 154 (1928).

Pentaclethra ? *griffoniana* Baill. in Adansonia, **6,** 206 (1866).

Newtonia klainei Pierre ex Harms in Engl., Bot. Jahrb. **40,** 18 (1907).

Newtonia glandulifera (*Pellegr.*) *Gilbert et Boutique* in Fl. Congo Belge, **3,** 215 (1952).

Piptadenia glandulifera Pellegr., Legum. Gabon, 21 (1949).

Newtonia hildebrandtii (*Vatke*) *Brenan*, comb. nov.

Piptadenia hildebrandtii Vatke in Oesterr. Bot. Zeitschr. **30,** 273 (1880).

var. **hildebrandtii.** Foliola ciliolis exceptis glabra vel sparse pubescentia. Axes inflorescentiarum pilis minimis arcuatis fere appressis puberuli.

Kenya (*Hildebrandt* 2492 !, isotype in Herb. Kew.), Tanganyika, Portuguese East Africa and Zululand.

var. **pubescens** *Brenan*, var. nov. Foliola utrinque plus minusve dense pubescentia vel puberula. Axes inflorescentiarum pilis parvis patentibus rectis vel plus minusve flexuosis puberuli.

Tanganyika. Shinyanga, *Koritschoner* 2009 (holotypus in Herb. Kew.). Singida District, 1130 m., 23 Sept. 1927, *B. D. Burtt* 1764. Singida District. Iwumbu R, in riverine forest, 1220 m., 10 Mar. 1928, *B. D. Burtt* 1397 :—tall trees 18–21 m. high, very local : vernacular name (Furu) " Mhingo ". Ruaha R., locally dominant with *Trichilia emetica*, *Tamarindus indica* and *Sapindaceae* as a riverine fringe, c. 610 m., 6 Nov. 1941, *Greenway* 6417 :—laxly branched tree up to 15 m. tall with spreading branches and greyish-black fairly rough bark ; pods flat, containing flat brown papery seeds.

Portuguese East Africa. Manica e Sofala Province. Between Mabote and Mambone, 3 Sept. 1944, *Mendonça* 2722 :—tree 25 m. high.

The new variety is characterised by its leaflets being more or less densely pubescent or puberulous on both surfaces, and by the longer indumentum on the axes of the inflorescences. Plants occur in Tanganyika (Shinyanga District. Ningwa R. near Mwantine village, 23 July 1931, *B. D. Burtt* 3318 ! Dodoma District. Msakiri, 17 Aug. 1938, *Savile* 12 !) whose leaflets have somewhat more pubescence than usual in var. *hildebrandtii* but which otherwise resemble it, and these may be looked upon as transitional between var. *hildebrandtii* and var. *pubescens*.

Newtonia leucocarpa (*Harms*) *Gilbert et Boutique* in Fl. Congo Belge, **3,** 214 (1952).

Piptadenia leucocarpa Harms in Engl., Bot. Jahrb. **53,** 457 (1915).

Newtonia paucijuga (*Harms*) *Brenan*, comb. nov.

Piptadenia paucijuga Harms in Engl., Bot. Jahrb. **51,** 368 (1914).

Cylicodiscus battiscombei Bak. f. in Journ. Bot. **67,** 198 (1939).

Cylicodiscus paucijugus (Harms) Verdc. in Kew Bull. **1950,** 364 (1950).

My comment, in Check-Lists For. Trees & Shrubs Brit. Emp. **5** (**2**) (Tanganyika Territory), 343 (1949), that *Cylicodiscus battiscombei* appeared to be a true *Cylicodiscus*, must be withdrawn. *Cylicodiscus gabunensis*, the type-species of the genus, possesses a disc differing in size and texture from that of *Newtonia paucijuga*, and in addition has the remarkable characters of alternate leaflets and stellate indumentum, which are not shared by *N. paucijuga*. In fact, the disc of *N. paucijuga* is very closely similar to that of *N. hildebrandtii*, which seems to be the closest relative ; the anthers of

both species lack an apical gland even in bud. The presence of an apical gland on the anther, though usual in the group of genera under discussion, seems not entirely constant. It may well be possible to recognise the species of *Newtonia* lacking this gland as a distinct section or subgenus, but not, I consider, as more.

Newtonia zenkeri *Harms* in Engl., Bot. Jahrb. **40,** 17 (1907).

B. *Species americanae*

Newtonia nitida (*Benth.*) *Brenan*, comb. nov.

Piptadenia nitida Benth. in Hook., Journ. Bot. **4,** 336 (1841).

Newtonia psilostachya (*DC.*) *Brenan*, comb. nov.

Acacia psilostachya DC., Prodr. **2,** 457 (1825).

Piptadenia psilostachya (DC.) Benth. in Hook. Journ. Bot. **4,** 336 (1841).

Newtonia suaveolens (*Miq.*) *Brenan*, comb. nov.

Piptadenia suaveolens Miq. in Linnaea, **18,** 589 (1844).

8. **Anadenanthera** *Speg.* in Physis, **6,** 313 (1923), *hic emend.*

Piptadenia Benth. Sect. *Niopa* Benth. in Hook., Journ. Bot. **4,** 340 (1841).

Niopa (Benth.) Britton et Rose in Addisonia, **12,** 37 (1927) ; N. Amer. Fl. **23,** 189 (1928).

Arbores inermes. Folia : petiolus supra basim glandula ornatus ; rhachis inter pinnas eglandulosus ; pinnae oppositae vel fere oppositae ; foliola multijuga. Flores in capitulis globosis conferti. Calyx necnon corolla (saltem lobi apices) extra puberula ; corollae lobi inter se alte conjuncti. Discus nullus. Ovarium extra pubescens vel glaber, sessile vel fere sessile. Legumina recta, secundum alterum marginem dehiscentia, secundum alterum valvis conjunctis, valvis valde coriaceis complanatis margine rectis vel inter semina plus minusve constrictis. Semina plana, acute marginata sed non alata, suborbicularia vel elliptica, exalbuminosa, atrobrunnea, nitida ; cotyledona dilatata, latiora quam longa ; funiculus plus minusve oblique in medio seminis affixus. Distr.: Amer. trop.

Anadenanthera colubrina (*Vell.*) *Brenan*, comb. nov.

Mimosa colubrina Vell., Fl. Flum. **11,** t. 16 (1835).

Piptadenia colubrina (Vell.) Benth. in Hook., Journ. Bot. **4,** 341 (1841).

Anadenanthera falcata (*Benth.*) *Speg.* in Physis, **6,** 314 (1923).

Piptadenia falcata Benth. in Hook., Journ. Bot. **4,** 341 (1841).

Anadenanthera macrocarpa (*Benth.*) *Brenan*, comb. nov.

Piptadenia macrocarpa Benth. in Hook., Journ. Bot. **4,** 341 (1841).

Piptadenia grata (Willd.) Macbr. in Contrib. Gray Herb., n.s., **59,** 17 (1919) (*Acacia grata* Willd., Enum. Hort. Berol. 1056 (1809)), based on a Brazilian specimen collected by Hoffmansegg, has been sometimes used for this species. Bentham (Trans. Linn. Soc. **30,** 372 (1875)) suggested that *A. grata* might be the same as his *Piptadenia macrocarpa*, but that Willdenow's description was too short for certainty. The authorities at Berlin kindly inform me that there is no specimen of *Acacia grata* now extant in Willdenow's herbarium. In the circumstances it would clearly be unwise to replace *macrocarpa* by an epithet of such uncertain application as *grata*.

Anadenanthera peregrina (*L.*) *Speg.* in Physis, **6,** 314 (1923).

Mimosa peregrina L., Sp. Pl. 520 (1753).

Piptadenia peregrina (L.) Benth. in Hook., Journ. Bot. **4,** 340 (1841).

Niopa peregrina (L.) Britton et Rose in Addisonia, **12,** 37 (1927) ; N. Amer. Fl. **23,** 189 (1928).

For further synonymy of this species, see Britton & Rose, *ll.cc.*

Anadenanthera was founded by Spegazzini to accommodate primarily *Piptadenia peregrina* and *P. falcata*, together with 5 Australian species unknown to him, on account of their anthers lacking an apical gland. This character alone does not seem to be of sufficient importance to justify generic separation, but both *P. peregrina* and *P. falcata* belong to the Sect. *Niopa* of *Piptadenia* as defined by Bentham, and thus to the genus *Niopa* as conceived by Britton & Rose. However, *Anadenanthera* antedates *Niopa* as a generic name, and must be adopted.

The Genera Calpocalyx and Pseudoprosopis.

Baker f. (Leg. Trop. Afr. 783–4 : 1930), in his key to the genera of the tribe *Adenanthereae*, separated these two genera as follows :—

Pods oblanceolate, very hard and woody; seed oblique . *Pseudoprosopis*

Pods broadly falcate or dolabriform, hard and woody . *Calpocalyx*

The pods of *Pseudoprosopis euryphylla* Harms, as shown by a specimen at Kew, *Gillman* 1015 from the Makonde Plateau, Tanganyika Territory, may be somewhat falcate, and, except for smaller size and less curvature, are not dissimilar to those of *Calpocalyx*. Such differences alone seem insufficient to keep the genera separate, and it has been therefore necessary to investigate their relationship anew.

As a result, it appears to be justified to maintain *Calpocalyx* and *Pseudoprosopis* as distinct genera, with the following differential characters :—

Calpocalyx	*Pseudoprosopis*
Trees, medium or large.	Shrubs or lianes, sometimes small trees.
Leaf rhachis glandular at insertion of pinnae.	Leaf rhachis eglandular.
Pinnae in one pair per leaf.	Pinnae normally in 2 or more pairs per leaf.

Calpocalyx	*Pseudoprosopis*
Flowers sessile.	Flowers pedicellate.
Petals united below into a tube $\frac{1}{3}$–$\frac{1}{2}$ or more as long as corolla.	Petals free or slightly united only at extreme base.

Calpocalyx sericeus Hutch. & Dalz. has always been an anomalous species in *Calpocalyx*. In all the characters mentioned above it agrees with *Pseudoprosopis* rather than with *Calpocalyx*. *Occasional* leaves of *C. sericeus* may have unijugate pinnae, but the better developed leaves have two pairs. The following transfer is therefore suggested :—

Pseudoprosopis sericea (*Hutch. et Dalz.*) *Brenan*, comb. nov.

Calpocalyx sericeus Hutch. et Dalz., Fl. W. Trop. Afr. **1,** 353 (July 1928) ; Kew Bull. **1928,** 400 (Dec. 1928).

When transferred to *Pseudoprosopis*, this species finds a natural and close affinity with *P. claessensii* (De Wild.) Gilbert et Boutique, from the Belgian Congo and Gaboon (see Gilbert & Boutique in Fl. Congo Belge, **3,** 224 : 1952). *P. sericea* differs from *P. claessensii* in the finer and closer indumentum on the young parts, in the leaflets being much more finely, densely and persistently sericeous beneath, and, judging from the description, in the differently shaped pods.

Mimosa

Mimosa pudica *L.*, Sp. Pl. 518 (1753).

Most of the many authors who have mentioned this pantropical weed, the famous Sensitive Plant, have considered it as a single uncomplicated species without subordinate taxa. The East African material of this at Kew is remarkably polymorphic, and this is also so almost throughout the range of the species. It is possible to express this polymorphism as a mixture of three infraspecific taxa, which are described below.

The typification of *M. pudica* L. presents considerable difficulty. According to Savage, Cat. Linn. Herb. 183 (1945), the only specimen in the Linnean Herbarium annotated as *M. pudica* has been written up by Solander and was sent by Patrick Browne, and was thus not seen by Linnaeus at the time of the first edition of the Species Plantarum (1753). In response to a request, the Director of the Naturhistoriska Riksmuseet at Stockholm wrote that no specimen of *M. pudica* annotated by Linnaeus could be traced there.

In addition to the diagnostic phrase at the beginning : " Mimosa foliis subdigitatis pinnatis, caule aculeato hispido ", and five lines of description at the end, four references to other works are made by Linnaeus under *M. pudica* (Sp. Pl. 518 : 1753) :—

(1) Hort. cliff. 208,

(2) Hort. ups. 144,

(3) Breyn. cent. 40. t. 18,

(4) Comm. hort. 1. p. 57. t. 29.

Breyne and Commelin, especially the latter, give excellent illustrations showing plants whose leaves have 3–4 pairs of pinnae, characteristic thus

not of *M. pudica* as generally accepted, but of *M. polydactyla* Humb. et Bonpl. ex Willd.

The Hortus Upsaliensis makes the same references to Breyne, Commelin, and the Hortus Cliffortianus.

There remains the Hortus Cliffortianus. The Breyne and Commelin references reappear, together with various others, of which two, those of Marcgraf and Piso, seem in part to refer to *M. pudica*. There is however a specimen in the Clifford Herbarium at the British Museum (Natural History) labelled " Mimosa major frutescens spinosa " (one of the synonyms quoted in Hort. Cliff. p. 208), which is *M. pudica* as generally accepted. It is sterile, although the mounter has endeavoured to conceal this by placing some foreign umbels in the axils ; this has caused the terse comment " Flores araliae " to be written on the sheet in a hand that Mr. J. E. Dandy informs me is that of Linnaeus himself.

It seems clear that the most important references under *M. pudica* in the Species Plantarum are to *M. polydactyla*, but that Linnaeus had no clear distinction in his mind between the two. To typify *M. pudica* by either the Breyne or Commelin references would mean that *M. polydactyla* would have to be called *M. pudica* and that *M. pudica* as generally interpreted would have to bear another name. *M. pudica* is, however, so important and well-known that this course is surely to be avoided if possible. I therefore propose that the specimen in the Clifford Herbarium referred to above be chosen as the lectotype of *M. pudica*. It is moreover the only actual specimen of this extant which was evidently examined by Linnaeus before 1753. In Hort. Cliff. 208 Linnaeus wrote "Petiolus ad apicem gerit folia quatuor-octo pinnata ", which suggests that Linnaeus had *M. polydactyla* partly in mind ; however this was probably a composite description derived from plants of *M. pudica* that he had seen and partly from Breyne and Commelin's pictures of *M. polydactyla*. He wrote (l.c.) however that the plant was " nostro tempore in hortis vulgatissima ", and both species may well have been grown at the time, but not separated from each other by Linnaeus.

The lectotype of *M. pudica* is, as we have said, sterile. It has a densely hispid stem, and stipules about 7–7·5 mm. long. It might be var. *tetrandra* or var. *unijuga*, but it is too incomplete for any certain decision. *M. pudica* var. *pudica* is therefore restricted to the lectotype, and three additional infraspecific taxa are here recognised.

The vars. *hispida* and *unijuga*, the two extremes, are remarkably uniform, and both occur over very wide areas. The var. *tetrandra* seems to occupy an intermediate position taxonomically, and to be more variable than the other two varieties. The true explanation may well be that vars. *hispida* and *unijuga* represent closely related but distinct species which can cross where they meet to produce var. *tetrandra*. In the West Indies, where var. *unijuga* is very common but var. *hispida* rare, the var. *tetrandra* is likewise rare. This suggestion is speculative, and requires testing experimentally ; the plant is so easily cultivated however that this should present no great difficulties.

Attempts have been previously made to express the variation of the plant.

The first mention of variants of *M. pudica* is by De Candolle in the Prodromus, **2,** 426 (1825), who gave var. *β glabrata* DC., with the stem glabrous, from the West Indian islands of S. Domingo and St. Thomas ; and var. *γ tetrandra* (Humb. et Bonpl. ex Willd.) DC., based on *M. tetrandra* Humb. et Bonpl. ex Willd., Sp. Pl. **4** (**2**), 1032 (1806), which was described as *M. pudica* in H.B.K., Nov. Gen. **6,** 252 (1823).

Grisebach, in Abh. K. Gesellsch. Wissensch. Göttingen **7,** 211 (1857), gives *Mimosa pudica* " *β unijuga* Walp." This is a reduction in rank of *M. unijuga* Duchass. et Walp. in Linnaea, **23,** 744 (1850).

Bentham in Hook., Journ. Bot. **4,** 367 (1841), wrote : " It varies much in hairiness ; the smoother forms are the *M. pudica*, Kunth, or *M. pudibunda*, Willd., the more hairy are the *M. pudica*, Linn., Willd., or *M. hispidula* Kunth ". In his later treatment of the *Mimosoideae*, in Trans. Linn. Soc. Lond. **30,** 397 (1875) he has two forms of *M. pudica*, neither described, but with various specific synonyms : f. *hispidior* and f. *glabrior*. This treatment is duplicated in Fl. Bras. **15** (**2**), 317 (1876). Since then authors in general have not recognised any subordinate taxa under *M. pudica*, with the notable exception of Fawcett & Rendle who, in Fl. Jam. **4** (**2**), 134 (1920), took up the two forms recognised by Bentham and described them, noting differences in the hispidity, stipule length, and bracts. The f. *glabrior* as defined by Fawcett & Rendle clearly corresponds with var. *unijuga*, while their f. *hispidior* is probably var. *hispida*. They wrote that " further investigation in the field is required to determine whether there are distinct forms, or whether they pass into one another."

I have not attempted to verify the specific synonymy given under *M. pudica* by Bentham, as the names would become of importance only if more than one species is recognised under *M. pudica*.

In the following account the specimens cited are merely a selection, unless otherwise stated at Kew ; to cite all would take too long.

M. pudica *L.*

var. **hispida** *Brenan*, var. nov.

Caules dense hispidi. Stipulae 8–14 mm. longae. Bracteolae 1·8–2·2 mm. longae, quam alabastra corollarum longiores, margine pilis setiformibus quam alabastra 1–1·5 mm. longioribus ciliatae. Corolla superne griseo-puberula.

China. Hainan, 1889, *Henry* 8264.
India. Sikkim, Aug. 1880, *Gamble* 8325. Nilgiris, S.E. Wynaad, 1884, *Lawson s.n.*
Indo-China. Saigon, 1901, *Debeaux* 244.
Siam. Chiengmai, 3 July 1911, *Kerr* 1890.
Java. *Junghuhn* 719 (holotypus varietatis in Herb. Kew.).
Philippines. *Cuming* 1261. Bautista, July 1903, *Merrill* 2867.
Gambia. Bathurst, 17 Dec. 1911, *Lane-Poole* 86.
Nigeria. Calabar, 4 May 1952, *Ejiofor* FHI. 31781. Oban, 1911, *Talbot* 1207.
Gaboon. Libreville, June 1900, *Debeaux* 189.
Belgian Congo. Boma, 1930, *Darremont* 46. Eala, 23 Nov. 1946, *Léonard* 1052.
Uganda. Kampala, 1930, *Mettam* 154.
Tanganyika. Amani, on the way to Bulwa, 12 Apr. 1926, *B. D. Burtt* 434.
Zanzibar. Kizimbani, 15 Feb. 1951, *Oxtoby* K14.

Pemba. *Vaughan* 457.
Cuba. Santiago de las Vegas, 1904, *Van Hermann* 59.
Brazil. Bahia, *Salzmann*.

The var. *hispida* is distinguished from the var. *tetrandra* by the capitula in bud having on their outside the setiform hairs arising from the bracteole margins projecting further out and more densely, also usually by the longer stipules and different habit. From var. *unijuga*, var. *hispida* differs in the longer stipules, longer bracteoles, and by the corolla being puberulous outside.

I have seen but little material of var. *hispida* from the New World ; it is hard to say whether this is due to real scarcity of the plant or to inadequate collecting.

var. **tetrandra** (*Humb. et Bonpl. ex Willd.*) *DC.*, Prodr. **2,** 426 (1825) ; G. Don, Gen. Syst. **4,** 383 (1832).

Mimosa tetrandra Humb. et Bonpl. ex Willd., Sp. Pl. **4** (**2**), 1032 (1806).

Caules dense hispidi vel fere glabri. Stipulae 4–8 (raro usque ad 9–10) mm. longae. Bracteolae circiter 1–1·5 mm. longae, saepius quam alabastra corollarum aequilongae vel breviores, nonnunquam longiores, margine pilis setiformibus paucis brevibus (usque ad circiter 0·75 mm.) vel absentibus. Corolla superne griseo-puberula.

China. Peiyunshan, Canton, 3 Sept. 1928, *Tsiang Ying* 1052.
India. Near Silligone (? Siliguri), Sept. 1872, *Gamble* 4072a (in part).
Java. *Zollinger* 263. *Koorders* 27121 β.
Amboina. July–Nov. 1913, *Robinson* 526.
Philippines. Luzon, Laguna Prov., Los Baños, *Merrill, Sp. Blancoanae* 36.
New Britain. Rabaul, *Froggatt* 8.
Caroline Is. Ponape, *Ledermann* 13958.
New Caledonia. Paita, 2 Oct. 1902, *Schlechter* 14882. Nouméa, 17 June 1909, *Franc* 1388.
Gaboon. *Milne s.n.*
Tanganyika. Amani, 14 Aug. 1916, *Peter* K 297.
Zanzibar. Zingwe-Zingwe, 21 Jan. 1929, *Greenway* 1104.
Mexico. Orizaba, 1866, *Bourgeau* 2671. Cordova, *Bourgeau* 1862.
Dominica. Laudat, 1903, *Lloyd* 228.
St. Vincent. *Guilding s.n.*
Trinidad. Woodbrook, 27 Sept. 1932, *Broadway s.n.*
British Guiana. Rupununi R., Aug. 1948, *Wilson-Browne* 23.
Brazil Bahia, *Salzmann s.n.*
Colombia. E. slope of W. Cordillera, 11 Nov. 1899, *Langlassé* 64. Arbelaez, 8 Feb. 1876, *André* 1422.

The var. *tetrandra* is distinguished from var. *hispida* in the way explained under the latter. In habit var. *tetrandra* usually resembles var. *unijuga* rather than var. *pudica*, and some extreme forms of var. *tetrandra* are only distinguished from var. *unijuga* by the puberulent corollas. Var. *tetrandra* is more variable than the other two, perhaps owing to the cause suggested above. The number of setiform hairs on the outside of the capitula of flower-buds is variable, but they are always fewer and shorter than in var. *hispida*.

Through the kindness of the Director of the Botanischer Garten und Museum, Berlin-Dahlem, a photograph of the type-specimen collected in South America (Herb. Willdenow No. 19069) of *Mimosa tetrandra* Humb.

et Bonpl. ex Willd. was sent to Kew. The following comments on this specimen were also kindly sent by Dr. D. E. Meyer :—

(1) the corolla-buds are puberulous outside,

(2) the hairs on the margins of the bracts exceed the corolla in bud,

(3) the length of the stipules : 5 mm.

This combination of characters, backed by the photograph, excludes the other two varieties, and seems to indicate a plant similar to those shown by *Robert Schomburgk* 508 (= *Richard Schomburgk* 788) from British Guiana, *Oersted* 22 from Costa Rica, and an unnumbered specimen collected by *Salzmann* at Bahia in Brazil, all in the Kew Herbarium.

var. **unijuga** (*Duchass. et Walp.*) *Griseb.* in Abh. K. Gesellsch. Wissensch. Göttingen **7,** 211 (1857) ; et in Fl. Brit. W. Ind. 219 (1860).

? *M. pudica* var. *glabrata* DC., Prodr. **2,** 426 (1825) ; G. Don, Gen. Syst. **4,** 383 (1832). *Synon dub.*

M. pudica f. *glabrior* Benth. in Hook., Journ. Bot. **4,** 367 (1841), *saltem pro parte* ; Fawcett et Rendle, Fl. Jam. **4** (**2**), 134 (1920).

M. unijuga Duchass. et Walp. in Linnaea **23,** 744 (1850).

Caules fere glabri vel nonnunquam densiuscule hispidi. Stipulae 4–7 (8) mm. longae. Bracteolae 0·7–1·1 mm. longae, quam alabastra corollarum breviores, margine pilis setiformibus paucis vel nullis. Corolla superne glabra vel fere glabra.

India. Travancore, 5 Nov. 1908, *Bourne* 5273.

Malaya. Penang, Feb. 1867, *Maingay* 2277.

Siam. Padang Besan, 25 Dec. 1927, *Kerr* 13627. Tripagodas, 7 May 1946, *Wichian* 340.

Tahiti. Papeete, Sept. 1909, *Leland, Chase & Tilden* 1.

Samoa. Avao, 12 Apr. 1906, *Vaupel* 123.

New Hebrides. Eromanga Is., 5 June 1928, *Kajewski* 370.

Fiji. *Greenwood* 392. Viti Levu, 10 June 1947, *A. C. Smith* 4750.

Hawaiian Is. Oahu, 29 Dec. 1929, *St. John* 10131.

Sierra Leone. Sumbuya, 19 Apr. 1929, *Deighton* 1692. Bo. 9 Apr. 1929, *Deighton* 1588.

Liberia. Monrovia, 1904, *Whyte*, 12 Nov. 1926, *Linder* 1532.

Kenya. Kibarani, 16 June 1945, *Jeffery* K. 228.

Seychelles. Mahé, *Gardiner s.n.*

Madagascar. *Baron* 1396, *Parker s.n.*

Mexico. Yucatan, Calotmul, *Gaumer* 345. Cordova, *Bourgeau* 1758 bis (vergens ad var. *tetrandram*).

British Honduras. All Pines, 12 Jan. 1931, *Schipp* 692.

Honduras. Aguan R. below Coyoles, 29 June 1938, *Tuncker, Koepper & Wagner* 8077.

Nicaragua. Greytown, 1867–8, *Tate* 94 (44).

Jamaica. Gray's Inn, Jan.–Feb. 1928, *Orcutt* 4676.

Haiti. La Vallée, Tortue Is., *E. C. & G. M. Leonard* 11586.

S. Domingo. *Ritter s.n.*

Porto Rico. 1899, *Heller* 187.

St. Kitts. Molyneux Estate, *Britton & Cowell* 335.

Guadeloupe. *Duchassaing* 30.

Martinique. 23 Nov. 1875, *André* 74.

Trinidad. *Sieber* 110.

Antigua. *Nicholson* 44.

Surinam. 1843, *Hostmann* 627.

Brazil. Bahia, Sept. 1837, *Gardner* 889.
Panama. 9 Jan. 1935, *Dodge & Allen* 17358. 1850, *Fendler* 96.
Colombia. *Cuming* 1092.

The var. *unijuga* is separated from the other two varieties by its corollas being glabrous or almost so, even in bud. From var. *hispida* it also differs in being less robust and in having shorter stipules.

The var. *glabrata* DC., is possibly the earliest name for this taxon, but its interpretation presents great difficulty. De Candolle (*l.c.*) wrote under his β *glabrata* :—" caule glabro—in ins. Sancti-Domingi et Sancti-Thomasii. Plum. ed. Burm. t. 202." Professor Baehni kindly states that there is no specimen of this in the Candollean Herbarium at Geneva. Burmann's description accompanying the Plumier plate cited is evidently mainly based on the hairy plant familiar to Burmann, but not that illustrated by Plumier. The localities cited by De Candolle are probably derived from one of the unpublished sets of Plumier plates that are known to exist ; it is unfortunately absent from the Kew set. Plumier's plate as issued by Burmann is not varietally identifiable. Although most of the West Indian material of *M. pudica* with glabrous or subglabrous stems belongs to var. *unijuga*, including a specimen at Kew collected on S. Domingo by *Ritter*, yet var. *tetrandra* with stems nearly glabrous has been collected in Trinidad by *Broadway*. In view of the doubt over its identity and the difficulty in accurately typifying var. *glabrata*, I propose that it be treated as a doubtful name, and the unambiguous var. *unijuga* be adopted for this taxon.

Through the kindness of the Director of the Systematisch-Geobotanisches Institut of the University of Göttingen, the specimens in the Grisebach Herbarium annotated as *M. pudica* var. *unijuga* have been received on loan. These include *Fendler* 1867, collected near Tovar in Venezuela, and two excellent sheets of a gathering from Guadeloupe, without collector's name but apparently collected by Duchassaing (see Grisebach in Abh. K. Gesellsch. Wissensch. Göttingen **7,** 211 (1857)), and bearing a label, apparently in Walpers's hand, on which the name " Mimosa unijuga (Duchass. & Walp.) " is written. This is evidently an authentic gathering, and I suggest that it be accepted as an isolectotype. It agrees excellently with var. *unijuga* as interpreted here, except that the leaves are all unijugate. However, I have repeatedly seen unijugate and bijugate leaves mixed on one and the same stem. and do not therefore consider this discrepancy of much significance.

Mimosa mossambicensis *Brenan*, nom. nov.

Mimosa violacea Bolle in Peters, Reise Mossamb. Bot. 8 (1861), non *M. violacea* Bonpl. ex Tenore, Ind. Sem. Hort. Neap. **1842,** 12 (1843).

Albizia

Albizia amara (*Roxb.*) *Boiv.* in Encycl. XIXme siècle, **2** : 34 (1834 ?).

subsp. **amara.**

Mimosa amara Roxb., Corom. Pl. **2,** 13, t. 122 (1798).

Albizzia gracilifolia Harms in Notizbl. bot. Gart. Berl. **8,** 146 (1922) ; Bak. f. Leg. Trop. Afr. 866 (1930). *mihi e descript. tantum cognita.*

Pinnae et foliola pauca, illae 4–12 (–16)-juga, haec 10–29-juga ; foliola 3–7·5 mm. longa, 0·75–1·5 (–2) mm. lata, matura subtus saepe glauca saltem in speciminibus asiaticis, nervis lateralibus praesertim basalibus subtus raro prominulis.

KENYA. Northern Frontier District, Sololo, 4 Sept. 1952, *Gillett* 13776 (K).

TANGANYIKA. Lindi District, *Gillman* 1531 (EA). Lindi District. Ruponda, 24 July 1947, *Semsei* 2081 (EA).

Typical *A. amara* has so far been known only from India and Ceylon, but the above-cited African specimens agree with those from Asia.

Certain specimens from Kenya (*Dale* K. 703 ! *Gillett* 12576 ! *Joana in Coryndon Museum Herbarium* 7388 ! *Edwards* 154 !, from the Northern Frontier and Kitui Districts) and Tanganyika Territory (*Peter* 32986 ! 33519 ! *Hornby* 427 ! 607 ! 608 ! *Burtt* 5015 !, from Mpwapwa and Dodoma Districts) are close to subsp. *amara*, but the leaflets are persistently appressed-pubescent on both surfaces and mostly smaller than usual. They may well prove varietally separable from subsp. *amara*.

subsp. **sericocephala** (*Benth.*) *Brenan*, subsp. et comb. nov.

A. sericocephala Benth. in Hook., Lond. Journ. Bot. **3,** 91 (1844) ; Milne-Redhead in Kew Bull. **1934,** 301 (1934).

[*A. amara* sensu Oliv. in Fl. Trop. Afr. **2,** 356 (1871) ; Gilbert & Boutique in Fl. Congo Belge **3,** 172 (1952), non (Roxb.) Boiv., *sensu stricto*].

A. struthiophylla Milne-Redhead in Kew Bull. **1933,** 144 (1933).

Pinnae et foliola plura, illae (7–) 14–46-jugae, haec (12–) 21–48-juga ; foliola 2–4 (–4·5) mm. longa, 0·5–1 (–1·25) mm. lata, plerumque subtus viridia, nervis lateralibus non distinctis.

Anglo-Egyptian Sudan and Eritrea southwards to Bechuanaland and the Transvaal.

Although the extremes of subsp. *amara* and subsp. *sericocephala* are distinct, the characters overlap so much that it seems preferable to treat the two as subspecies.

Albizia schimperiana *Oliv.* in Fl. Trop. Afr. **2,** 359 (1871).

This species proves to have a remarkably wide range of variation, and it does not seem possible to maintain *A. maranguënsis* Taub. ex Engl. and *A. amaniënsis* Bak. f. as specifically distinct from it. The three following variants are proposed :—

var. **schimperiana.**

A. schimperiana Oliv., *l.c., sens. strict.*

? *A. maranguënsis* Taub. ex Engl. in Abhandl. Preuss. Akad. Wiss. **1891,** 241 (1892) ; Bak. f., Leg. Trop. Afr. 867 (1930).

Pinna omnis apicem versus paulum angustata ; foliola parium duorum distalium pinnarum 8–21 (–23)-juga, pare terminali quam alia paulum minore, 7–21 mm. longa, 3·5–8·5 mm. lata, duplo vel triplo longiora quam lata. Indumentum pedicellorum et calycis et corollae brunneum. Ramuli juveniles brunneo-pubescentes.

Anglo-Egyptian Sudan and Ethiopia southwards to Portuguese East Africa and Southern Rhodesia.

A. maranguënsis is referred to var. *schimperiana* with some doubt, as the syntypes (*Meyer* 359, 367), which I have not seen, are now destroyed, and the leaflets were described as 15–25 mm. long and 7–15 mm. wide, in up to 14 pairs ; *A. maranguënsis* may thus in part be synonymous with *A. schimperiana* var. *amaniënsis* (see below), although most specimens in herbaria named *A. maranguënsis* are certainly var. *schimperiana*.

The type specimen of *A. schimperiana*, *Schimper* 1396, Ethiopia, being in fruit, does not provide evidence about the colour of the indumentum on the outside of the flowers, and there are no flowering specimens of *A. schimperiana* from Ethiopia at Kew. In response to a request, Prof. R. Pichi-Sermolli of Florence kindly wrote : " I have consulted our herbarium and I have only found two specimens of *Albizzia schimperiana* provided with flowers. I have examined them and I have seen that the indumentum of calyx and corolla is brown, like that of *A. maranguensis*." He also generously sent some flowers of one of the two specimens, *Giordano* 2501 from Ambò, Scioa, Ethiopia. Clearly the possibility of grey indumentum on the flowers occurring in Ethiopia cannot be excluded, but on what scanty evidence there is it seems more reasonable to define var. *schimperiana* as I have done above.

var. **tephrocalyx** *Brenan*, var. nov.

Pinna omnis apicem versus paulum angustata ; foliola 6–17-juga, pare terminali quam alia paulum minore, 10–21 mm. longa, 4–6 mm. lata, plerumque triplo longiora quam lata. Indumentum pedicellorum et calycis et corollae griseum brevissimum. Ramuli juveniles aureo- vel griseo-pubescentes.

Uganda. West Nile District. Payida, common in riparian strips, 1520 m., Feb. 1934, *Eggeling* 1484 *in F.H.* 1424 (K, holotypus varietatis, ENT, isotypus) :—tree to 18 m., flat-topped ; flowers white. Near Payida, Mar. 1935, *Eggeling* 1925 (ENT) :—flat-topped tree to 18 m. ; flowers pure white ; fruits thin, reddish-brown. Acholi District. Lututuru, Feb. 1938, *Eggeling* 3495 (ENT) :—dominant tree in mountain forest ; flowers white ; pods persistent : vernacular name (Acholi) " ober ".

Similar to var. *schimperiana*, but indumentum on inflorescence grey not brown. The var. *tephrocalyx* also resembles *A. isenbergiana* (A. Rich.) Fourn., but has larger leaflets and longer pedicels. I am most grateful to the Chief Conservator of Forests, Entebbe, Uganda, for kindly sending me on loan from the Forest Department Herbarium material of this and other Albizias.

var. **amaniënsis** (*Bak. f.*) *Brenan*, var. et comb. nov.

A. amaniënsis Bak. f. in Journ. Bot. **70,** 255 (1932).

Pinna omnis apicem versus plus minusve dilatata ; foliola 5–11-juga, pare terminali quam alia paulum majore, plerumque 10–30 mm. longa, 5–16 mm. lata, circiter duplo longiora quam lata. Indumentum ut in var. *schimperiana*.

Tanganyika. Moshi District : Rau and Kilimanjaro, 11 Dec. 1924, *Lewis* 224 (K) :—tree. Rau Forest, Moshi, Nov. 1938, Wigg 1444 (EA). Moshi–Marangu road, 29 Dec. 1934, *R. M. Davies* 985 (K, EA). Lushoto District. Amani, 18 Jan. 1910, *Zimmermann* G. 3026 (K, EA, isotypi varietatis).

The var. *amaniënsis* is apparently distinct from the other two varieties by the pinnae somewhat broadening upwards, with the terminal pair of leaflets somewhat larger than the others.

In some ways var. *amaniënsis* is similar to *A. glaberrima* var. *mpwapwensis* (see below), but differs in the indumentum of the inflorescence being brown not grey, and in the apex of the leaflets not being minutely emarginate. The possibility of var. *amaniënsis* being the product of crossing between *A. glaberrima* var. *glabrescens* (see below) and *A. schimperiana* var. *schimperiana* should, I feel, be borne in mind.

Albizia glaberrima (*Schumach. et Thonn.*) *Benth.*

The nomenclature and synonymy of typical *A. glaberrima* have been cleared up by Keay in Kew Bull. **1953,** 489–490 (1954), and his conclusions, with which I am in agreement, need not be repeated here. One further synonym, *A. eggelingii*, is, however, added.

The limits of *A. glaberrima*, however, need further discussion. Aubréville, Fl. Forest. Soudano-Guin. 300 (1950) considered *A. glabrescens* Oliv. and *A. warneckei* Harms (i.e. *A. glaberrima*, sens. strict., the true identity of which was at that time misinterpreted) as conspecific, with which I agree. However, taking *A. glaberrima* in a wide sense, it is certainly possible, indeed necessary, to recognise variants within it, and the following scheme is therefore proposed :—

var. **glaberrima.**

A. eggelingii Bak. f. in Journ. Bot. **76,** 237 (1938).

Foliola subtus ubique minute et appresse puberula, apice subacuta vel acuta, costa supra usque ad partem apicalem folioli puberula.

From the Gold Coast to the Anglo-Egyptian Sudan and Uganda, southwards to the French Cameroons and apparently Angola.

var. **mpwapwensis** *Brenan*, var. nov.

Foliola subtus minute et appresse puberula, apice obtusa, costa supra basi tantum puberula aliter glabra.

Tanganyika Territory. Mpwapwa, on brown soil close to water, fairly common, 1070 m., 13 Dec. 1931, *Hornby* 402 (K, EA) :—tree 15 m. high. Mpwapwa, Kikombo streams, riverine fringing forest, 1070 m., 30 Nov. 1933, *B. D. Burtt* 5016 (K, holotypus varietatis, EA, isotypus) :—medium tree 13 m. high, locally frequent.

The var. *mpwapwensis* shares with var. *glaberrima* the minute puberulen-weon the lower surface of the leaflets, but differs in the leaflet apex, indumentum of midrib on upper side, and in the glaucescence of the lower surface of the leaflets.

For the distinction between var. *mpwapwensis* and *A. schimperiana* var. *amaniënsis*, see under the latter.

var. **glabrescens** (*Oliv.*) *Brenan*, var. et comb. nov.

A. glabrescens Oliv. in Fl. Trop. Afr. **2,** 357 (1871).

Foliola subtus in costa puberula aliter glabra vel fere glabra, apice obtusa, costa supra basi tantum puberula aliter glabra vel subglabra, raro usque ad partem apicalem puberula.

Belgian Congo, Kenya, Tanganyika Territory, Zanzibar, Nyasaland, Portuguese East Africa, Northern and Southern Rhodesia.

The var. *glabrescens* differs from the other two varieties in the almost or quite complete absence of the minute puberulous appressed hairs from the lower surface of the leaflets (apart from the midrib).

CONTRIBUTIONS TO THE FLORA OF AUSTRALIA : II.

Some Ranunculi of Tasmania and South Eastern Australia.

R. Melville

In the early days of the botanical exploration of Australia a number of diverse kinds of *Ranunculus* were discovered and were given specific rank. The more superficial features of the flowers, leaves and habit were used in this classification, as at that time the critical value of the characters of the ripe achenes and the nectaries was not appreciated. As material accumulated, the variation in vegetative characters obscured the supposed specific distinctions, with the result that Bentham in the Flora Australiensis lumped together a number of plants that are in fact distinct species. A re-examination of the old types and much new material has now been made and a uniform series of descriptions illustrated by camera lucida drawings of critical features is presented below.

One of the chief centres of confusion is *R. lappaceus* Sm., a name that covers a complex of closely related forms and under which Bentham placed *R. pimpinellifolius* Hook., *R. scapigerus* Hook., *R. pascuinus* (Hook. f.) Melville, *R. nanus* Hook. and *R. cuneatus* Hook. Some of the variation within this group consists of differences in the sizes of structures suggesting the possibility of polyploidy. The pollen grains and stomata of some of its members have been examined and in some instances the size differences indicate that polyploidy occurs. The nature of the differences between these plants are not, however, of specific rank, chromosome number being only one of the complex of correlated characters that determine taxonomic rank. Nevertheless, a cytological investigation of Australasian *Ranunculi* would yield much valuable information.

1. **R. lappaceus** *Sm.* in Rees Cycl. **5,** 29, No. 61 (1819).

The type specimen was collected by Dr. White at Port Jackson and is preserved in Smith's herbarium in the keeping of the Linnean Society of London. The sheet bears specimens in flower with stems up to 38 cm. high and a single head of full grown but unripe achenes. The form represented bears fairly short appressed hairs in the upper part of the stems and longer stiff appressed hairs below. The leaves are ternate, pinnatifid, with rather narrow lobes and the terminal leaflet has a pedicel about 1–3 cm. long (Fig. 1, **9**). The petals and achenes conform with those illustrated here. The following description is a composite one, embracing the forms seen and accepted by the present author.

Radical leaves 1·5–6 cm. broad, ternate with the terminal leaflet ± ternatisect and coarsely dentate, the lobes 1·5 5 mm. broad and the teeth acute to obtuse or ternately lobed with the lobes of variable breadth (up to 10 mm. broad in var. *latilobus* Hook. f.), petioles 1·5 -20 cm. long, lamina and petiole thinly to densely covered with short stiff appressed hairs or with longer flexible spreading hairs. Cauline leaves ternatisect, the upper often simple, linear lanceolate. Flowering stems 10–50 cm. high with 1–10 flowers, appressed strigose throughout or with appressed hairs only below the flowers and spreading pilose in the lower $\frac{1}{2}$–$\frac{3}{4}$. Flowers 20 30 mm. diameter. Sepals 5, spreading, elliptic to ovate, hooded below the apex, which may be prolonged into a linear beak,

green, ± densely provided with appressed or spreading hairs, margins of the inner sepals glabrous, hyaline, three principal nerves forked near the base and branched and sometimes anastomosing above. Petals 5, bright golden, obovate cuneate, rounded or slightly emarginate, with numerous nerves, nectary at the base with a thin cuneate truncate

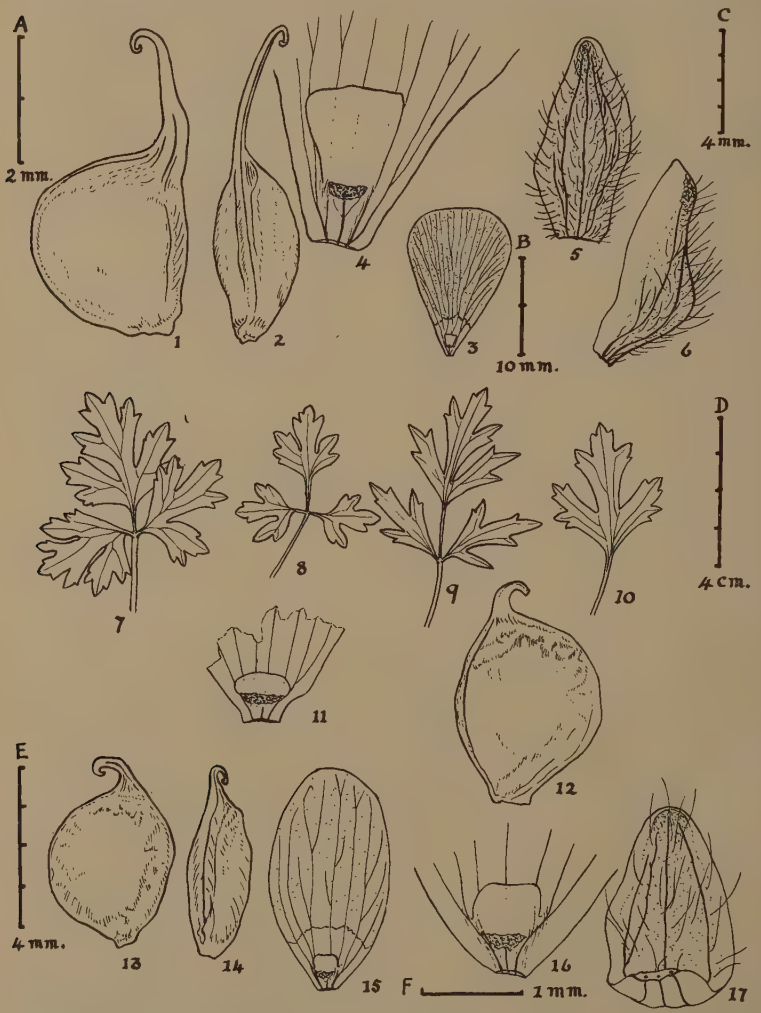


Fig. 1. *Ranunculus lappaceus* Sm. 1, 2, mature achenes ; 3, petal ; 4, nectary ; 5, 6, sepals ; 9, characteristic leaf shape as on Smith's type ; 10, predominant leaf shape in Tasmanian plants ; 1–6, 10, from Melville 2447, Blackmans Bay, Forestier Peninsula, Tasmania ; 9 from Melville 1819, Victoria Valley, Grampians, Victoria. *R. plebeius* R. Br. ex DC. 7–8, leaves, 7, matching the type ; 11, 16, nectaries, 12–14 achenes ; 15, petal ; 17, sepal ; 7, from Herb. Sydney 16320, E. F. Constable, Mt. Cambewarra, N.S.W. ; 11–12 from R. Brown 5253, type ; 8, 13–17 from Melville 2868, Hopping Joe Ck., Genoa River, N.S.W. Scales : 1, 2, 4, 11–14, 17 A ; 3, B ; 5–6 C ; 7–10, D ; 15, E ; 16, F.

lobe joined laterally to the petal in its lower half, basal starch free zone extending about $\frac{1}{4}$ of the petal length. Stamens about 50, carpels about 50. Achenes sublenticular, ovate to broad-ovate, about 3–3·5 mm. long with the laterally placed stylar beak $\frac{3}{4}$ or equal in length, usually erect, $\pm$ arching and coiled at the tip, lateral faces of achene smooth, glabrous or occasionally with a few hairs, usually with a distinct marginal ridge below the beak, the abaxial side slightly shouldered and often with a few irregular $\pm$ rounded ridges. Receptacle hispid between the achenes, glabrous in the staminal region.

The plant illustrated (Fig. 1, **1–6, 10**) was collected at Blackman's Bay, North of Murdunna on the Forestier Peninsula (Melville No. 2447) and is representative of the Tasmanian form of *R. lappaceus*. The petals and achenes are similar to those of the type, from which it differs in its spreading indumentum.

2. **R. plebeius** *R. Br. ex DC.* Syst. Veg. **1,** 288 (1817).

The type was collected by Robert Brown " in paludos prope Kingstown. Oct.–Nov. 1804 " (R. Br. No. 5253). In the Flora Australiensis **1,** 13 (1863), Bentham cites *R. hirtus* Banks & Sol. ex DC. in Syst. Veg. **1,** 289, as a synonym and most later authors have taken up the name of this New Zealand plant for the Australian species. Reference to the type specimen of *R. hirtus* left no doubt that the two are distinct species, *R. hirtus* differing markedly in foliage and achenes. The accompanying figures (Fig. 1, **7, 8, 11–17**) show critical features of *R. plebeius*.

Radical and lower cauline leaves ternate with the apical leaflet trilobed, the terminal lobe deeply trifid with the apex tridentate or, in early leaves, the terminal lobe tridentate, teeth acute to obtuse, uppermost cauline leaves (bracts)linear lanceolate, 3–15 mm. long, appressed hispid or occasionally subglabrous above, hispid below, petioles 5–20 cm. long, appressed to spreading hispid. Flowering stems branched from near the base, 20–40 cm. tall, $\pm$ appressed hispid above, spreading hispid below. Flowers 7–10 mm. diameter ; sepals 5, reflexed, ovate to elliptic, blunt, concave, $\pm$ hooded at the apex, with 3 principal nerves branching mainly in the upper half, $\pm$ setose hispid on the back ; petals 5, golden, elliptic to obovate cuneate, apex rounded, nectary $\frac{1}{15}$–$\frac{1}{12}$ petal slightly length above the base, with an oblate elliptic to short oblong truncate or emarginate lobe looped to the petal near its base, basal starch free zone extending $\frac{1}{5}$–$\frac{1}{4}$ of the petal length. Stamens about 25–30, carpels about 40–60. Achenes 2·5–3 mm. long, with a stylar beak $\frac{1}{5}$–$\frac{1}{3}$ as long, sublenticular, suborbicular to obovate cuneate, lateral faces smooth except at the margins which are obscurely and irregularly ridged and $\pm$ rugose at the abaxial border. Receptacle sparingly hispid between the achenes, glabrous in the staminal zone.

3. **R. scapigerus** *Hook.* in Hook. Journ. Bot. **1,** 244 (1834).

The type specimen was collected by Gunn as No. 229 of 1833. No exact locality is recorded and it is mounted with No. 229 of 1842 collected on Grass Tree Hill, Hobart, Tasmania 27.11.1840. J. D. Hooker maintained the species in the Flora Tasmanica, but added two varieties, var. β *concinnus* and var. γ *decurvus*, that do not belong to it. Bentham, in the

Flora Australiensis, reduced it to varietal rank under *R. lappaceus* Sm., while Rodway in his Tasmanian Flora followed the same course, but included *R. pimpinellifolius* Hook. as a synonym.

There is considerable variation in the size of plants from different localities, due probably to edaphic and altitudinal effects. One of the Gunn collections, No. 229 from St. Patrick's River, 16.11.1844, is exceptionally vigorous. Pollen grains from this and from the type specimen were measured and the cubes of the linear dimensions were found to be in the ratio of 1·7 : : 1. This ratio is of the order usually found between tetraploids and diploids and it is probable that the larger plants are polyploids.

Fig. 2. *Ranunculus scapigerus* Hook. 1, 6, achenes ; 2, 9, petals ; 3, 7, 8 sepals ; 4, 5, nectaries ; 1–5 from Gunn 229, 1833-type ; 6–9 from Gunn 229, 16.11.1844, St. Patrick's River, Tasmania (presumtive tetraploid). Scales : 1, 6, A ; 2, 3, 7–9, C ; 4, 5, B.

Radical leaves in a rosette, 7 20 mm. broad, palmate with 7 subequal teeth to deeply trilobed or trifoliolate with terminal lobe or leaflet obovate to suborbicular, cuneate, dentate and lateral lobes cuneate tridentate to ± bilobed and multidentate, sericeous pilose on both surfaces, petioles 1–10 cm. long spreading pilose. Flowering stems 1–2 flowered, erect, 2 25 cm. tall, appressed strigose beneath the flowers, spreading pilose below ; the bract, when present, linear to linear lanceolate or trifurcate placed $\frac{1}{3}$–$\frac{2}{3}$ up the stem. Sepals reflexed, elliptic to ovate, hooded at the apex which is often prolonged into a linear beak, ± densely setose pilose on the back, with 3 principal nerves branching and anastomosing above. Petals golden, ± flushed with red on the outer surfaces, narrowly to broadly elliptic with the nectary about $\frac{1}{15}$ petal length above the base, having an oblong lobe, rounded or truncate at the apex adhering laterally to the petal for $\frac{3}{4}$ or more its length and a narrow arc of secretory tissue. Stamens about 25–30, carpels about 40–50, sometimes with a few stout

hairs on their margins. Achenes about 2 mm. long or 3 mm. in the presumed polyploid, with a slender stylar beak about $\frac{1}{3}$–$\frac{1}{2}$ as long, erect or arching and ± coiled at the apex, body of achene obovate, sublenticular, lateral faces smooth with a distinct marginal ridge below the style, somewhat shouldered and obscurely ridged abaxially. Receptacle ± hirsute between the achenes, glabrous in the staminal zone. (Figs. 2 ; 5, **1, 2**).

Typical Tasmanian plants have simple uniflorous stems that are either ebracteate or have simple linear bracts or occasionally small cuneate tridentate bracts. Gunn's No. 229 from St. Patrick's River, the presumed polyploid referred to above, and a collection from Mount Buffalo, Victoria (Melville No. 2684) have the stems more or less branched with 1–5 flowers and a variable number of cauline leaves and bracts. The lower cauline leaves may be trifoliolate, like the radical leaves, up to 33 mm. broad, or trilobed, obtusely dentate, the upper ones being trifurcate to simple elliptic acute. The radical leaves are more regularly and distinctly trifoliolate than in the typical form and up to 40 mm. broad. The pollen grains of the Mt. Buffalo plants are well within the size range of the presumed diploids, so that the differences are not necessarily due to polyploidy. The presumed polyploid has stems up to 35 cm. tall and flowers up to 20 mm. diameter. In their flowers and fruits, these plants differ in no important way from those of the typical form, but they differ appreciably in their vegetative aspect and are here given varietal status.

R. scapigerus *Hook.* var. **foliosus** *Melville*, var. nov. ; a typo caulibus ± ramificatis 1–5-floribus, foliis caulium trifoliolatis, trilobatis vel trifurcatis differt.

Tasmania. St. Patrick's River, *Gunn* 229, 16.11.1844.

Victoria. On the grassy banks of a rivulet in a gully N. of Wilfred's Hill, Mount Buffalo Plateau, altitude 4800 ft., *R. Melville* No. 2684, 1.1.1953. (Holotypus in Herb. Kew.).

4. **R. pimpinellifolius** *Hook.* in Hook. Journ. Bot. **1,** 243 (1834).

The type specimen of this species was collected by R. Gunn growing with *R. lappaceus* (Gunn No. 90) and its occurrence among taller herbs evidently accounts for its somewhat etiolated appearance. The plant described by Hooker as var. *β vestitus* (Icones Plant. 260, 1839) appears to be the normal condition of the species and neither this nor the var. *α glabrior* Hook. f. in Hook. Journ. Bot. **2,** 401 (1840) is worthy of separate taxonomic rank. J. D. Hooker later, in the flora Tasmanica, **1,** 6 (1855) confused the plant with the New Zealand *R. hirtus* Banks and Sol., while Bentham in the Flora Australiensis **1,** 12 (1863) reduced it to varietal rank under *R. lappaceus* Sm. Rodway (Flora Tasm., 3, 1903) equated it to *R. scapigerus* Hook. as a variety of *R. lappaceus* Sm.

Radical leaves in a rosette, 5–35 mm. broad, pinnate, with 3–5 leaflets, terminal leaflet ± 3 lobed and coarsely dentate, lateral leaflets ovate to obovate, with 3–5 teeth, cuneate to rounded-obtuse at the base, both surfaces hirsute, petioles 1–17 cm. long, spreading hirsute. Flowering stems spreading outwards from the rosette, 2–25 cm. long, patently hirsute, with 1–2 flowers and the upper bract usually linear. Flowers pale yellow,

1–1·5 cm. diameter. Sepals 5, elliptic to narrow-broad ovate, concave, margins hyaline, often with a subterminal rounded beak, ± densely setose-pilose, with 3 principal nerves branching from near the base. Petals elliptic to obovate-cuneate, nectary about $\frac{1}{10}$ petal length above the base with a thin rounded to subacute triangular lobe, often attached at different levels on the two sides. Stamens about 30, carpels about 20–30. Achenes about 2–2·5 mm. long, sublenticular, obovate cuneate, sessile, lateral faces punctate with a large cell pattern, smooth or slightly dimpled, ± obscurely warty toward the abaxial margin and shouldered below the erect triangular stylar beak which is $\frac{1}{3}$–$\frac{1}{4}$ as long as the achene. Receptacle hispid between the achenes, hispid to glabrous in the staminal region. (Figs. 3 ; 5, **3, 4**).

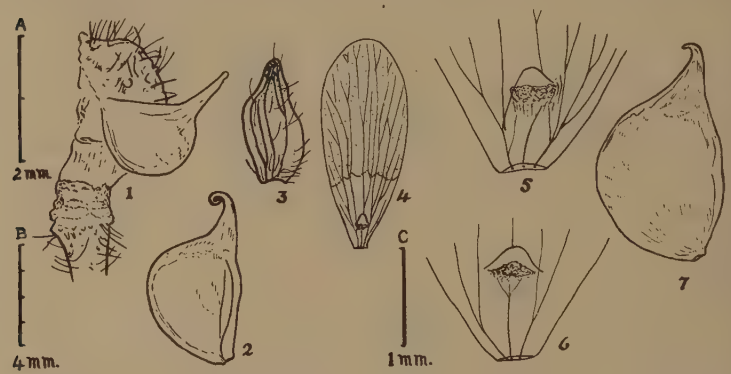


Fig. 3. *Ranunculus pimpinellifolius* Hook. 1, receptacle ; 2 immature, 7 mature achene ; 3, sepal ; 4, petal ; 5, 6, nectaries ; 1–6 from type, " with Gunn 90 " ; 7 from Gunn 635, 1844, Blackman's River, Tasmania, type of var. *vestitus* Hook. Scales : 1, 3, 4, B ; 2, 7, A ; 5, 6, C.

5. **R. pascuinus** (*Hook. f.*) *Melville*, sp. nov. et stat. nov. *R. lappaceus* Sm. var. *γ pascuinus* Hook. f. in Fl. Tasm., **1,** 6 (1855) ; *R. lappaceus* Sm. var. *δ uniflorus* Hook. f., loc. cit. ; *R. lappaceus* Sm. var. *subsericeus* Bentham in Fl. Austral., **1,** 13 (1863).

Different collections of Gunn's No. 634 formed the basis of two of J. D. Hooker's varieties of *R. lappaceus* Sm. in the Flora Tasmanica, but the citation of the specimens is obscure and can only be clarified by reference to the herbarium material. The numbers Gunn 90 and 633 are cited immediately after the specific description : of these, No. 90 is var. *α*, which represents the common Tasmanian race of *R. lappaceus* and No. 633 is var. *β latilobus*. Gunn 634 is cited for both vars. *γ* and *δ*, but localities are mentioned under ' habitat '. The Hampshire Hills and Marlborough specimens are mounted on one sheet and they and the collection from Arthur's Lakes are all large plants 15–30 cm. tall. It is evident that these represent var. *γ pascuinus* and the collection from Launceston consisting of small plants only 5–10 cm. tall represent var. *δ uniflorus*. There is an error therefore, in the Flora Tasmanica at the top of page 7 where " var. *δ* " should read " var. *γ* " and " var. *δ* " should be inserted before " near Launceston " on the second line. These four gatherings of No. 634 are all growth forms of one species and in raising it

to its correct rank the sheet from Arthur's Lakes, 17.1.1845 is selected as lectotype. This has both flowers and full grown, but unripe, fruit.

Leaves in a radical rosette, 5–30 mm. broad, pinnately tripartite, or pinnate with 3–5 leaflets, terminal leaflet lanceolate to elliptic, acute, sometimes with a pair of small teeth towards the apex, lateral leaflets and lobes lanceolate to elliptic, acute, occasional leaves simple, linear lanceolate to elliptic acute, appressed-strigose, more densely below, with rather short hairs tapering to the base and the apex, petioles $1\frac{1}{2}$ cm. long, appressed strigose. Flowering stems uniflorous, appressed-strigose. Flowers 10–20 mm. diameter ; sepals 5, ovate, blunt, hooded at the apex, ± densely appressed-strigose, the inner with hyaline margins, with 3 principal nerves branching and anastomosing in the upper $\frac{2}{3}$; petals golden, often ± flushed with red on the outer surface, obovate cuneate, rounded or emarginate at the apex, 8–12 mm. long, nectary about $1\frac{1}{2}$ petal length above the base, with a thin semicircular to oblong rounded lobe free above a narrow arc of secretory tissue ; stamens about 30 ; carpels about 40–50. Achenes 3–4·5 mm. long, obovate cuneate, sublenticular with a suberect to aquiline stylar beak $\frac{1}{4}$–$\frac{1}{3}$ as long, lateral faces ± smooth with a slightly raised marginal ridge. (Figs. 4 ; 5, **5–7**). Receptacle ± hirsute between the achenes, glabrous in the staminal zone.

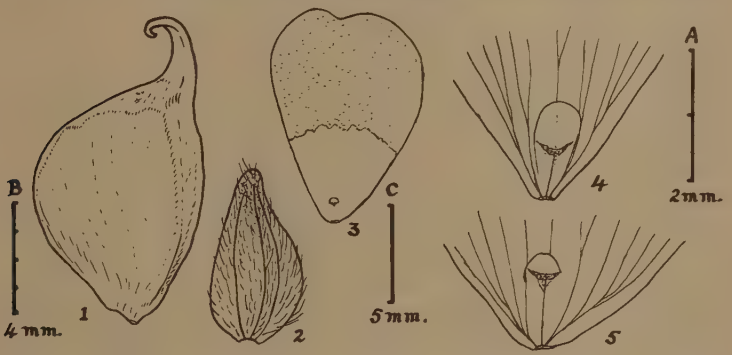


Fig. 4. *Ranunculus pascuinus* (Hook. f.). Melville. 1, achene ; 2, sepal ; 3, petal ; 4, 5, nectaries ; 1 from Gunn 634, 1837, Hampshire Hills, Tasmania ; 2, 3, 5 from Gunn 634, 17.1.1845, Arthur's Lakes, lectotype ; 4 from Gunn 634. 16.11.1844, near Launceston, Tasmania. Scales : 1, 4, 5, A ; 2, B ; 3, C.

6. **Ranunculus ligulatus** *Melville*, sp. nov.; *R. millani* F. Muell. affinis sed lobis foliorum latioribus, petalis aureis lobis nectariorum ligulatis, acheniorum rostris longioribus differt.

Folia trifurcato-trilobata, 2·5–7 cm. longa, lobis lineari-lanceolatis, petiolis 1·5–5 cm. longis, patenti-hirsutis. Flores laete aurea ; sepala 5, ovato-oblonga obtusa flavo-viridia trinervata, dorso longe-piloso vel subglabro ; petala 5 cuneato-obovata, basi nectariis ligulatis instructa ; stamina circa 30–35; achenia circa 15–25, 3·5 mm. longa, 2·5 mm. lata, glabra ; scapi 2–10 cm. longi, basi patenter albo-pilosi, supra pilis appressis instructi.

Victoria : Mt. Buffalo, altitude 4600 ft., Melville No. 2585, 27.12.1952 (Holotypus in Herb. Kew.).

This species was collected around the margin of a small shallow pool on Mt. Buffalo in the valley to the East of The Horn, a frost hollow covered with snow grass (*Poa caespitosa* agg.). *R. millani* (Melville No. 2584) was growing in the pool in 2–3 ins. of water and on the damp mud near the water. *R. ligulatus* was growing on dry mud at the upper level of flooding and among the grass around the margin of the pool, suggesting at first that it might be a form of *R. millani* induced by the dryer conditions. The two plants differ in the following points : *R. ligulatus* has the petals deep golden with the maximum breadth about $\frac{3}{4}$ the petal length above the base, instead of pale creamy yellow petals with maximum width about $\frac{1}{3}$ from the base ; the nectary lobe is tongue-shaped and up to 0·5 mm. long, with no swelling below the lobe, and situated about $\frac{1}{1\frac{1}{2}}$ the petal length above the base, whereas in *R. millani* the nectary is a small semi-lunar pocket situated about $\frac{1}{4}$ the petal length above the base at the top of a protruding column ; the sepals are usually hairy with hairs up to half the length of the sepal, while in *R. millani* they are usually glabrous but may have a few short hairs (Figs. 6, **2, 3** ; 12, **4, 5, 12**). *R. ligulatus* also bears some resemblance to *R. nanus* Hook., but there are differences in the lobing of the leaves and the flowers are larger and the nectaries differ considerably in shape.

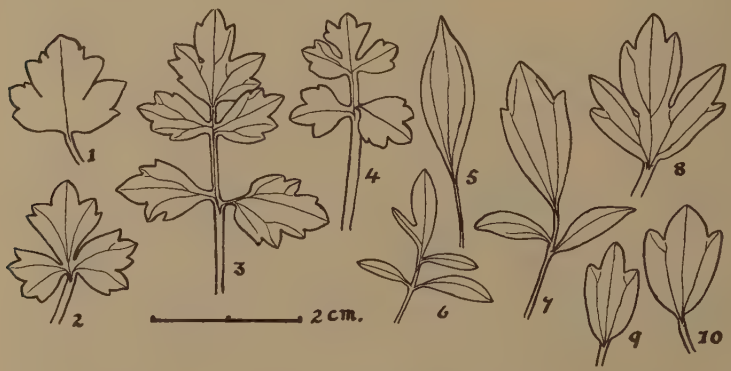


Fig. 5. *Ranunculus* leaves. 1, 2, *R. scapigerus* Hook. ; 3, *R. pimpinellifolius* Hook., and 4, var. *vestitus* Hook. ; 5–7, *R. pascuinus* (Hook. f.) Melville ; 8–10, *R. triplodontus* Melville —all from type specimens.

Leaves in a rosette, 8–30 mm. broad, ternate, the terminal leaflet of 3 divergent linear lanceolate lobes, or with the lateral lobes bifid, the lateral leaflets bifid or trifid with linear lanceolate divergent lobes, subglabrous to hirsute above, more densely so below, petioles 1–5 cm. long ± densely hirsute with spreading white hairs. Flowering stems uniflorous, 2–10 cm. long, subglabrous to short pilose above, long hirsute below. Flowers 12–20 mm. diameter ; sepals 5, narrowly ovate to oblong, blunt or cowled and prolonged into a narrow beak, the inner with a hyaline margin, ± hirsute on the back, with 3 principal nerves ± branched above and the laterals sometimes from near the base, petals bright golden, obovate cuneate, rounded at the apex, the basal starch free zone extending $\frac{1}{3}$–$\frac{1}{4}$ up the petal, nectary situated about $\frac{1}{1\frac{1}{2}}$ petal length from the base, consisting of a small glandular pocket with a

rounded triangular to linear oblong blunt lobe free from the petal and without a distinct decurrent ridge ; stamens about 40 ; carpels about 20. Achenes about 2·5 mm. long with a rather broad erect triangular beak about $\frac{1}{3}$ as long, hooked at the apex, sublenticular, broad obovate, lateral faces smooth, marginal ridges slightly developed, slightly shouldered below the beak. Receptacle $\pm$ hispid between the achenes, glabrous in the staminal zone. (Fig. 6).

The smaller lobed nectaries of *R. ligulatus* approach those of *R. pimpinellifolius* Hook., but in that species long tongue-shaped lobes are not developed and the attachment at either side is often at different levels. The leaf segmentation is different in the two species.

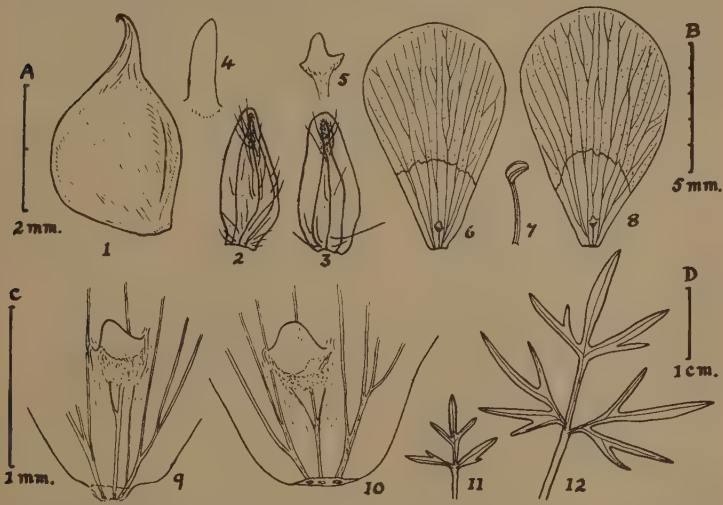


FIG. 6. *Ranunculus ligulatus* Melville. 1, achene ; 2, 3, sepals ; 4, 5, nectary lobes ; 6, 8, petals ; 7, stamen ; 9, 10, nectaries ; 11, 12, leaves ; all from Melville 2585, Mt. Buffalo, Victoria, holotype. Scales : 1, A ; 2, 3, 6–8, B ; 4, 5, 9, 10, C ; 11, 12 D.

7. **Ranunculus concinnus** (*Hook. f.*) *Melville* sp. nov. et stat. nov., *R. scapigerus* Hook. var. *concinnus* Hook. f. in Fl. Tasm. **1,** 7 (1855).

The history of this species is similar to that of *R. decurvus*. J. D. Hooker at first regarded it as a species, but published it as a variety. The type specimen, Gunn No. 1934, was collected in Tasmania " on the summit of the Western Mountains N. of Arthur's Lakes at an elevation of 3,500 to 4,000 ft. above the sea on 17th January 1845 ". Gunn's field note continued—" It is remarkably like *R. scapigerus* in leaf, but very distinct in its fruit and other points ". The similarity between the leaves of these species is superficial and due to a similar indumentum with the close approximation of the three leaflets of *R. concinnus* mimicking the palmate leaves of *R. scapigerus*. *R. concinnus* was ignored by Bentham in the Flora Australiensis and by Rodway in his Flora of Tasmania.

Leaves all radical, 8–25 mm. broad, ternate, occasionally pinnate, terminal leaflets, suborbicular, ternately lobed with broad obtuse to acute teeth, lateral leaflets quinately or ternately lobed with obtuse to acute

teeth and broad cuneate to subtruncate base, both surfaces appressed hirsute, petioles 1·5–10 cm. long, hirsute with ± spreading hairs. Flowering stems 1·5–10 cm. long, uniflorous, densely appressed hispid above, spreading hispid below. Flowers about 5–8 mm. diameter ; sepals 5–8 ovate to elliptic, concave, with a hyaline margin and green back raised near the apex into a rounded beak or cowl with scattered long hispid hairs and 1–3 nerves forked towards the top ; petals 0–5, about 2·5–3·5 mm. long narrowly elliptic, blunt, with 3 nerves, the central forked above the nectary, which is placed about $\frac{1}{3}$ of the petal length above the base forming a tumid semilunar bracket. Stamens about 15, carpels about 20 30. Achenes about 2·5–3 mm. long, sublenticular, semicircular to semielliptic, with a short straight to aquiline stylar beak about $\frac{1}{5}$–$\frac{1}{4}$ as long and cuneate base, lateral faces smooth or with a few obscure rounded protuberances below the beak and without any marginal ridges. Receptacle hispid between the carpels and glabrous or nearly so in the staminal zone. (Fig. 7).

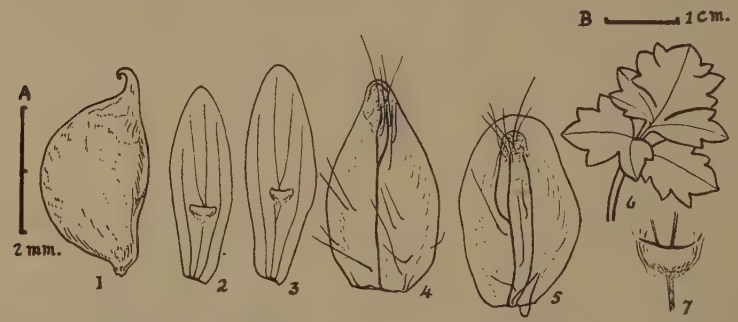


Fig. 7. *Ranunculus concinnus* (Hook. f.) Melville. 1, achene ; 2, 3, petals ; 4, 5, sepals : 6 leaf ; 7, nectary ; all from Gunn 1934, Arthur's Lakes, Tasmania, type. Scales ; 1–5, A ; 6, B.

Petals of golden-flowered species of *Ranunculus* normally contain starch in the golden zone of the petals. If the zonation of the petals is not clear after dissection a little iodine will soon make it apparent. Petals from the type of *R. concinnus* did not respond to this test, so that they are probably of a uniform pale yellow colour. A petal of an unnumbered Gunn specimen gave a faint reaction only in a small island of tissue toward its apex. The petal colour should be checked in the field.

8. **Ranunculus decurvus** (*Hook. f.*) *Melville* sp. nov. et stat. nov., *R. scapigerus* Hook. var. *decurvus* Hook. f. in Fl. Tasman. **1,** 7, t. 2A (1855).

The type specimen of this species was collected by R. Gunn (No. 1937) on the St. Patrick's River N.E. of Launceston, Tasmania, at an altitude of 2,000 ft. 16.11.1844. Gunn wrote that it was abundant in very wet places in a granite region, but it was difficult to see except upon very close examination of the ground. The label on the sheet bears the name *R. decurvus* Hook. f. though it was not published with the rank of species, but as a variety of *R. scapigerus* Hook., with which it does not appear to be very closely related. It passed unnoticed in the Flora Australiensis and in Rodway's Flora of Tasmania. The habit of the plant is shown in

J. D. Hooker's figure, but his diagnosis is very brief and an amplified description is given below.

Leaves all radical, 4–12 mm. broad (up to 25 mm., cultivated), ternate, terminal leaflet with 5 acute lobes, lateral leaflets sharply trilobed, median lobe the largest, both surfaces appressed hispid, petioles 1–3 cm. long appressed hispid. Flowering stems 5–15 mm. long (up to 30 cm., cultivated), uniflorous, densely appressed hispid, reflexed in fruit. Flowers pale yellow about 3–4 mm. diameter ; sepals 5, ovate-elliptic, blunt, hyaline, with a few long hairs on the back and 2–3 simple or sparingly branched nerves ; petals 5, linear blunt, about 2–2·5 mm. long with 2–3 nerves, the median with 1 or 2 branches, nectary a tumid semilunar bracket attached $\frac{1}{2}$–$\frac{2}{3}$ the petal length from the base, at the top of a decurrent ridge ; stamens 5 10 ; carpels 10–15. Achenes 2–2·5 mm. long, semicircular to obovate cuneate, sublenticular with a stout stylar beak about $\frac{1}{5}$–$\frac{1}{3}$ as long, lateral faces smooth or with a few small low rounded protuberances or ridges near the margin. Receptacle ± hispid between the achenes. (Fig. 8).

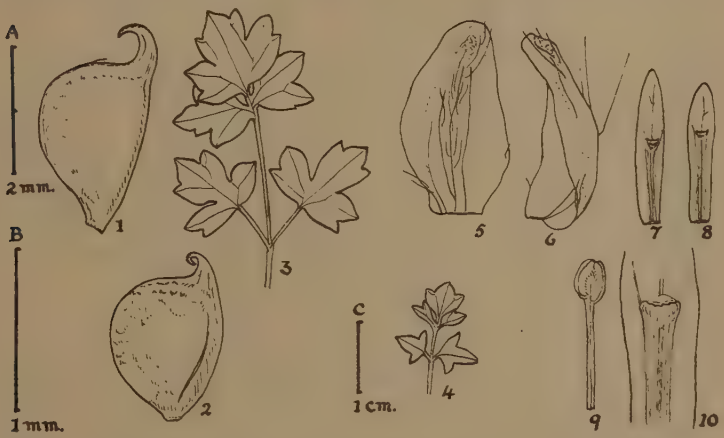


Fig. 8. *Ranunculus decurvus* (Hook. f.) Melville. 1, 2, achenes ; 3, 4, leaves ; 5, 6, sepals ; 7, 8, petals ; 9, stamen ; 10, nectary ; 1–3 from W. M. Curtis, 7.12.1944, cult, Hobart from Mt. Field National Park, Tasmania ; 4–10 from Gunn 1937, 16.11.1844. St. Patrick's River, Tasmania, type. Scales : 1, 2, 5–9, A ; 3, 4, C ; 10, B.

The petals are free from starch and are probably of a pale yellow colour. They are narrower than in *R. concinnus* and differ also in the nectary placed farther up the petal at the top of a decurrent ridge.

9. **R. nanus** *Hook.* in Hook. Journ. Bot., **1,** 242 (1834).

This species was based on a collection by Lawrence (No. 324), but the location in Tasmania is not recorded. J. D. Hooker gave a more detailed description in the Flora Tasmanica **1,** 7 (1855), citing an additional collection by Gunn (No. 1935) from Arthur's Lakes, 17.1.1845. Gunn's field note accompanying this says : " Very abundant in all wet places ; edges of streams, margin of Arthur's Lakes, etc., on the summit of Western Mountains. . . . . ' Leaves that have probably developed under

water are glabrous or nearly so and have narrow segments, others developed subaerially are hirsute with broader segments.

Leaves all radical, 4–16 mm. broad, glabrous to ± hirsute, ternately lobed, or ternate with the terminal leaflet trilobed, its lobes narrow to broad lanceolate, lateral leaflets narrowly lanceolate entire to ovate tridentate ; petioles 5–30 mm. long glabrous to ± densely hirsute, basal sheaths always ± hirsute. Flowering stems 1–5 cm. long, uniflorous, glabrous to ± hirsute. Flowers yellow, about 8–12 mm. diameter ; sepals 5, oblong elliptic, blunt, concave, hooded at the apex, ± hyaline, 3 nerved, glabrous or with a few hairs ; petals 5, obovate oblong, with the nectary about $\frac{1}{5}$ petal length above the base, nectary a small projecting tumid semilunar pocket decurrent along the claw in a rounded ridge, pale yellow starch free zone extending nearly halfway along the petal ; stamens about 20–30 ; carpels about 15–20. Achenes about 2–2·5 mm. long, sublenticular, elliptic to ovate, gradually tapered into a broad stylar beak about $\frac{1}{2}$ as long as the achene, lateral faces smooth, minutely dimpled, slightly shouldered below the beak, shoulders ± smooth to slightly rugose. Receptacle hispid between the achenes glabrous, in the staminal zone. (Fig. 9).

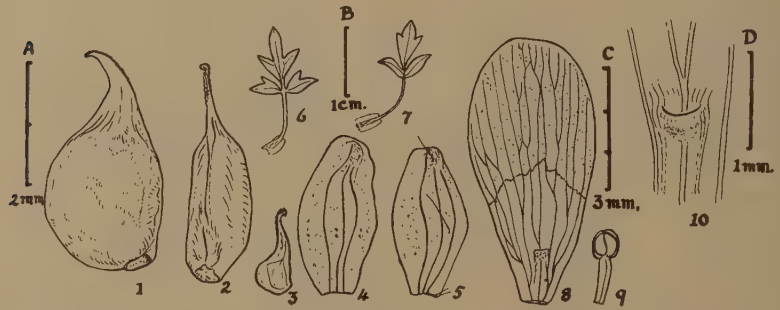


Fig. 9. *Ranunculus nanus* Hook. 1, 2, achenes ; 3, carpel ; 4, 5, sepals ; 6, 7, leaves ; 8, petal ; 9, stamen ; 10, nectary ; all from Lawrence 324, Tasmania, type. Scales : 1, 2, A ; 3–5, 8, 9, C ; 6, 7, B ; 10, D.

10. **Ranunculus triplodontus** *Melville*, nom. nov., *R. cuneatus* Hook. in Hook. Journ. Bot. **1,** 242 (1834)*, non Sommerf. in Mag. Naturvid. **11** (2), 239 (Dec. 1833).

W. J. Hooker's publication of this species is invalidated as a later homonym of *R. cuneatus* Sommerf. and a new name is required. The type specimen is Gunn's No. 228 collected in 1833 in Tasmania, but no field notes on this number have survived. J. D. Hooker maintained the species in the Flora Tasmanica and stated that the nectary is similar to that of *R. nanus*. Typical nectaries are illustrated in Figs. 9, **10** and 10, **7.** In *R. triplodontus* the decurrent ridge below the nectary is more or less keeled, but it is rounded in *R. nanus*. The species also differ in leaf shapes and in the extent of the paler basal starch free zone of the petal, which scarcely reaches half way in *R. nanus*, but extends for $\frac{3}{4}$–$\frac{4}{5}$ of the petal

* The whole of this volume was published in 1834 : see Gard. Mag., 85 (1835). Publication of the volume was erroneously stated to extend from 1834–1839 in Flora Malesiana Ser. I, **1** (5) CLXXXIX (1954).

length in *R. triplodontus*. Bentham in the Flora Australiensis equated *R. cuneatus* Hook. to his own *R. lappaceus* var. *nanus*, but Rodway considered it synonymous with *R. lappaceus* Sm. var. *subsericeus* Benth.

Radical leaves mostly 8–15 mm. broad, oblong with 3 subequal teeth in the upper $\frac{1}{3}$–$\frac{1}{2}$, or the central tooth the larger, and a rounded to subcuneate base varying up to 28 mm. wide, or leaves ovate with 1–2 secondary teeth to each major tooth, or sometimes trilobed or ternate, or in small submerged plants, narrowly oblong cuneate to linear lanceolate and 1·5 mm. broad, glabrous above with ciliate margins and glabrous or ± hirsute below, petioles 1–10 cm. long, subglabrous or ± hirsute. Flowering stems 1–15 cm. high, rather stout, ± hirsute with 1–5 flowers ; sepals 2–5, concave, ± hyaline, often with a subterminal rounded beak or cowl and a few scattered long hairs ; petals 0 (?)–6, oblong to elliptic, blunt, tapered into a claw in the lower $\frac{1}{3}$ or $\frac{1}{4}$, nectary about $\frac{1}{3}$ petal length above the base, a small pocket sometimes with a small rounded triangular fleshy lobe, decurrent along the claw in a ± keeled ridge, pale yellow starch free zone extending along $\frac{3}{4}$–$\frac{4}{5}$ of the petal ; stamens

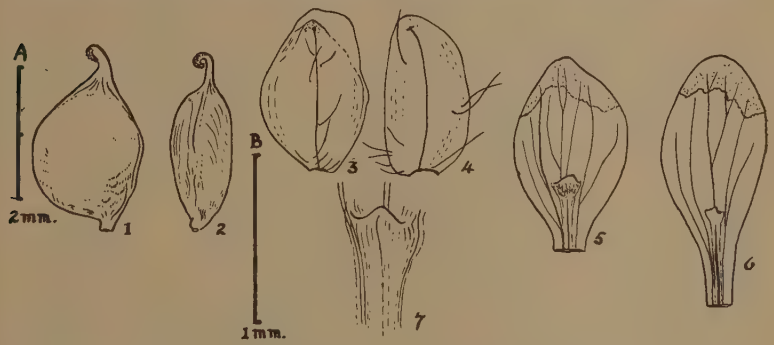


Fig. 10. *Ranunculus triplodontus* Melville. 1, 2, achenes ; 3, 4, sepals ; 5, abnormal, 6, normal petal ; 7, nectary ; all from Gunn 228, Tasmania, type. Scales : 1–6, A ; 7, B.

about 10 ; carpels about 6–10. Achenes about 2 mm. long with a short triangular stylar beak coiled at the tip about $\frac{1}{4}$ the achene length, sublenticular, with a very short pedicel, lateral faces smooth but punctate with a rather large cell pattern, slightly shouldered abaxially and without marginal ridges. Receptacle hirsute between the carpels and occasional hairs in the staminal zone. (Figs. 10 ; **5, 8–10**).

11. **R. graniticolus** *Melville*, sp. nov. ; *R. lappaceo* Sm. affinis sed caulibus unifloris, lobis nectariorum emarginatis brevibus oblongis vel leviter attenuatis, rostris acheniorum brevioribus et latioribus differt.

Folia omnia radicalia hispida, ternata vel biternata, lobis cuneatis tridentatis ; caules erecti uniflori ; flores 15–20 mm. diametro, sepalis 5 patentibus hirsutis, petalis 5, laete aureis, obovatis cuneatis, lobis nectariorum emarginatis vel truncatis brevibus oblongis vel leviter attenuatis ; stamina et ovaria circa 30-40 ; achenia 2·5–3·5 mm. longa, semiorbiculata vel subcuneato-obovata, lateribus glabris, rostris crassis arcuatis praedita ; receptacula inter achenia hispida.

Victoria. Mt. Buffalo Plateau, valley below Stonehenge, in subalpine pasture on granite, about 4,600 ft. altitude, *Melville* No. 2579, 27.12.1952 (Holotypus in Herb. Kew.).

New South Wales. Thredbo River Gorge, Mt. Kosciusko, *L. A. S. Johnson et E. F. Constable*, 19.1.1951, Sydney Herb. No. 15884.

Leaves all radical, 15–20 mm. broad, ternate to biternate, the leaflets ternately lobed, with the central lobe ternately toothed, cuneate at the base, a few central leaves of the rosette reduced to simple, linear lanceolate, 1·5–3 mm. broad, 8–12 mm. long, hispid on both surfaces or ± hirsute below ; petioles 2–12 cm. long, hirsute with white spreading hairs. Flowering stems erect, 5–20 cm. tall, uniflorous, appressed hispid under the flowers, spreading hirsute below. Flowers bright golden, 15–22 mm diameter ; sepals spreading, oblong blunt to ovate, concave, hooded at the apex and sometimes prolonged into a linear beak, green, inner with hyaline margins, ± densely hirsute on the back, with 3

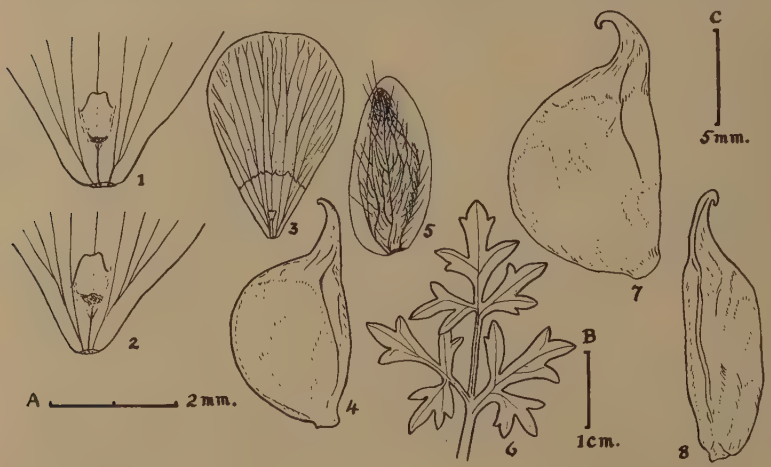


Fig. 11. *Ranunculus graniticolus* Melville. 1, 2, nectaries ; 3, petal ; 4, 7, 8, achenes ; 5, sepal ; 6, leaf ; 1–6 from Melville 2579, Mt. Buffalo, Victoria, type ; 7–8 from Herb; Sydney 15884, L. A. S. Johnson & E. F. Constable, Mt. Kosciusko, N.S.W. Scales : 1, 2, 4, 7, 8, A ; 6, B ; 3, C.

primary nerves forked from near the base and anastomosing above ; petals obovate cuneate, apex rounded, nectary placed about $\frac{1}{10}$ petal length above the base, with a short oblong or slightly tapering lobe, emarginate to truncate, attached laterally to the petal for $\frac{1}{4}$–$\frac{1}{2}$ its length, starch free basal zone extending about $\frac{1}{3}$ of the petal length ; stamens about 30–40 ; carpels about 30–40. Achenes 2·4–3·5 mm. long, semi-orbicular to obovate subcuneate, tapering rather gradually into a stout arching stylar beak about $\frac{1}{4}$ -$\frac{1}{3}$ as long, sublenticular, with the lateral faces smooth and marginal ridges slightly developed, indistinctly shouldered and slightly rugose below the beak. Receptacle hispid between the achenes, glabrous in the staminal zone. (Fig. 11).

12. **R. millani** *F. Muell.* in Hook. Kew Journ. **7,** 358 (1855)

The type locality is on Mount Wellington, Gippsland, but Mueller collected this species in several places on the Victorian Alps in subalpine situations in and around small pools or depressions in the grassy frost hollows. The illustrations (Fig. 12, **1 12**) are from one of his collections, unlocalised, but possibly a duplicate type.

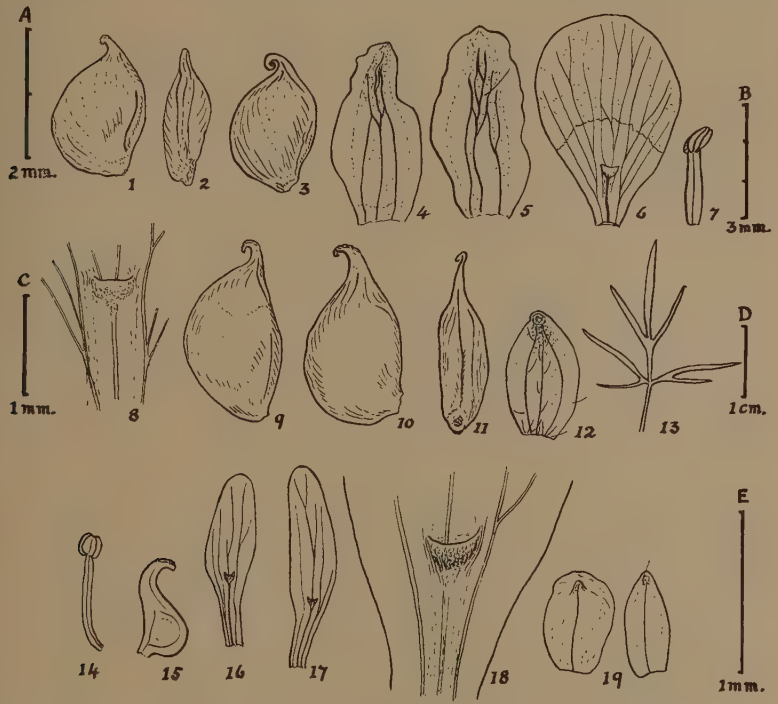


Fig. 12. *Ranunculus millani* F. Muell. 1–3, 9–11, achenes ; 4, 5, 12, sepals ; 6, petal ; 7, stamen ; 8, nectary ; 13, leaf ; 1–8 from F. Mueller, Victorian Alps, syntype ? ; 9–13 from Melville 3123, Bentley's Plain, Mt. Nugong, Victoria. *R. setaceus* Rodway. 14, stamen ; 15, carpel ; 16, 17, petals ; 18, nectary ; 19, sepals ; from Rodway, Western Mountains, Herb. Univ. Hobart. Scales : 1–3, 9–11, A ; 4–7, 12, 14–17, 19, B ; 8, C ; 13, D ; 18, E.

Leaves radical, pinnately divided into slender linear segments, sometimes with secondary divisions, with a spread of 7 30 mm , glabrous or with 1 to several hairs from the terminal glands, petioles 1 8 cm. long, glabrous or sparingly hirsute. Some vegetative increase occurs by short stolons, which may sometimes become erect and bear 2 3 flowers. Flowering stems mostly uniflorous, 5–80 mm. tall, glabrous or sparingly hirsute. Flowers creamy white, 7–15 mm. diameter ; sepals 5, spreading, oblong blunt, sometimes hooded, with green back and white margins, glabrous or with a few hairs, 3 nerves anastomosing above ; petals usually 5 (up to 10 according to Mueller), obovate cuneate with rounded apex and the nectary about $\frac{1}{4}$ petal length above the base, nectary a semilunar pocket, merging below into the thickened claw of the petal, pale yellow starch free

zone extending $\frac{1}{3}$ to nearly $\frac{1}{2}$ way up the petal ; stamens about 25 ; carpels about 15–30. Achenes 2–2·5 mm. long, tapering ± gradually into an arching beak about $\frac{1}{5}$ as long, narrow to broad obovate subcuneate, or ovate, sublenticular, lateral surfaces smooth, finely punctate sometimes ± dimpled, usually ± shouldered below the beak, shoulders obscurely rugose. Receptacle with a few hairs between the achenes, glabrous in the staminal zone. (Figs. 12, **1–13**).

13. **R. setaceus** *Rodway* in Proc. Roy. Soc. Tasm. 1900–1901, 107 (1902).

Although Rodway described this plant from the Ironstone Range as a species, he made no mention of it shortly afterwards in the Flora Tasmanica (1903). There he includes *R. millani* F. Muell. (p. 2) although the plant illustrated (opposite p. 8) is evidently his *R. setaceus*. The two plants are closely related ; *R. setaceus* has smaller flowers and narrower petals, but the nectaries are similar. Its correct rank is probably that of a variety of *R. millani*, but further collecting is desirable before altering its status. No significant difference was found between the sizes of the pollen grains of *R. setaceus* and *R. millani*, so that both probably have the same chromosome number. I am indebted to Dr. W. M. Curtis of the University of Tasmania, Hobart for the loan of a specimen collected by Rodway on the Western Mountains, from which the following description has been compiled and the drawings (Fig. 12, **14–19**) prepared.

Leaves in a rosette, 2–6 cm. long, linear, simple or trifurcate with linear lobes, glabrous, basal sheaths glabrous or with a few rather long hairs. Flowers about 5–8 mm. diameter, single, on stems 5–20 mm. long ; sepals 5, oblong blunt to suborbicular, with a subapical cowl, ± hyaline, uninerved, glabrous or with 1–few hairs near apex ; petals 5, lanceolate to narrowly ovate, blunt, slightly contracted below, with the nectary about $\frac{2}{5}$ the petal length above the base, consisting of a small crescentic pocket surmounting a ridge decurrent on the claw below ; stamens about 10–15 ; carpels about 10–15, with a few hairs on the receptacle between them. Achenes not seen.

14. **Ranunculus inundatus** *R. Br. ex DC.* in Syst. Veg. **1,** 269 (1817).

The type specimen in the British Museum (Nat. Hist.) was collected by Robert Brown " in paludosis exsiccatis prope Williams River, Nov. 1804". A duplicate of this New South Wales collection, No. 5255, is at Kew and was used to prepare the drawings (Fig. 13, **1–7**). Confusion entered early into the interpretation of this species. W. J. Hooker in Hook. Journ. Bot. **1,** 242 (1834) cited Gunn 396 as this species. This must refer to 396 of 1833 which is *R. rivularis* Banks & Soland. A later gathering, Gunn 396 of 1835, is *R. glabrifolius* Hook. and has the label stuck over the roots of one plant with the reference " Hook. Journ. Bot. 242 " written on it. The two gatherings were originally mounted on one sheet, suggesting a possible confusion of labels as well as of plants. J. D. Hooker in the Flora Tasmanica **1,** 8 (1855) cited Gunn 396 and 774. There are several gatherings of Gunn 774 at Kew, all *R. rivularis*. As *R. glabrifolius* is upheld in this flora, it is clear that J. D. Hooker had misidentified *R. rivularis* as *R. inundatus*. Bentham (Fl. Austral. **1,** 14, 1863) corrected this

error, giving *R. inundatus* Hook. f. as a synonym, with *R. rivularis* Banks & Sol., of his *R. rivularis* var. *subfluitans*, but fell into another by equating *R. inundatus* R. Br. to *R. glabrifolius* Hook., which was his *R. rivularis* var. *major*. This series of errors resulted from a failure to appreciate the critical value of the characters of the petals and nectaries and the ripe achenes, as will be seen from a comparison of Figs. 13 and 18.

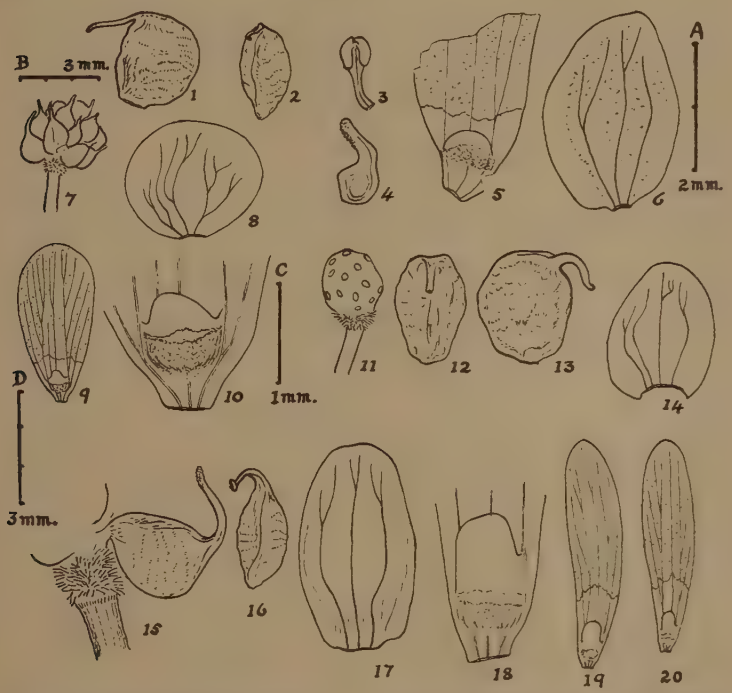


FIG. 13. *Ranunculus inundatus* R. Br. ex DC. 1, 2, 15, 16 immature, 12, 13, mature achenes ; 3, stamen ; 4, carpel ; 5, petal fragment with nectary ; 6, 8, 14, 17, sepals ; 7, head of achenes ; 9, 19, 20, petals ; 10, 18, nectaries ; 11, receptacle showing hairs, also in 15 ; 1–7 from R. Brown 5255, William's River, N.S.W., type ; 8–14 from F. A. Rodway 205, Nowar-Berry, N.S.W., 13.11.1930 ; 15–20, narrow petalled form, Melville 2149, Sale, Victoria. Scales : 1–6, 11–13, 15–17, A ; 7, 19, 20, B ; 8, 9, 14, D ; 10, 18, C.

Radical leaves palmatisect, 1·0–4·0 cms. broad, with segments 0·5–2·0 mm. wide, glabrous, petioles 1–15 cm. long, glabrous or with a few flexible hairs, basal sheaths ± pilose, cauline leaves palmatisect to trisect. Flowering stems slender, erect, 5–30 cm. high, with 1–3 flowers, glabrous or pilose at the base, vegetative stems creeping, rooting at the anodes. Flowers golden, 1–1·5 cm. diameter ; sepals 5, elliptic, blunt, to suborbicular, concave, glabrous, ± hyaline, with usually 3 nerves forked above ; petals 5–7, narrowly obovate, to oblanceolate-elliptic, apex rounded, nectary basal with a semicircular lobe looped to the petal at the margins, or lingulate to 1 mm. long, with broad rounded apex and margins attached at $\frac{1}{3}$–$\frac{1}{2}$ its length from the base ; stamens about 25–30 ; carpels about 20–30. Mature achenes sublenticular, about 1·5–1·8 mm.

long with a reflexed stylar beak about $\frac{1}{2}$–$\frac{2}{3}$ as long, lateral faces with an irregular rounded ridge at the margin and the surface with obscure irregular warty ridges, abaxial surface with a broad flattened area at the base of the style. Receptacle with a dense circlet of short hairs at the base in the staminal zone. (Figs. 13 ; 16, **3**).

It is especially important in this group of aquatic species to obtain ripe achenes. Immature achenes of several species dry with a shallowly ridged or ripple marked surface and the characteristically sculptured surface does not develop till an advanced stage. The type specimen of *R. inundatus* bears immature achenes and it was necessary to make very careful comparison of all available characters to correlate it with other conspecific material and discriminate it from *R. papulentus* and *R. undosus*. *R. inundatus* is widespread in Victoria, New South Wales and Southern Queensland. A form with rather narrow petals was collected in a marsh bordering the Thomson River, W. of Sale, Victoria (Melville No. 2149).

15. **R. papulentus** *Melville*, sp. nov. ; *R. inundato* R. Br. ex DC. affinis sed lobis foliorum latioribus et paucioribus, nectariis truncatis et receptaculis inter achenia hispidis, glabris vel subglabris inter stamina differt.

Folia radicalia palmatisecta, 1·5–5 cm. diametro, segmentis latis 2–6 mm., supra glabris vel subglabris, subtus ± pilosis, petiolis longis 4–18 cm.; folia superiora caulium linearia ; caules 10–25 cm. alti, 2–4-flori ; flores 1·5–2 cm. dimetro, sepalis 5–6, oblongis vel ovatis, obtusis, glabris vel breviter hispidis, petalis 5–9, aureis, ellipticis vel oblanceolatis obtusis, lobis nectariorum truncatis ; stamina circa 30–40 ; ovaria circa 40–50 ; achenia circa 2 mm. longa, semicordata vel late subcuneata, rostris tenuibus praedita, latera acheniorum unduloso-papillata, culminibus marginalibus irregulariter rotundatis ; receptacula hispida inter achenia, glabra vel subglabra inter stamina.

Australian Commonwealth Territory. Canberra–Yass road, 1 ml. from Federal Highway *C. W. E. Moore* No. 3054 17.1.55 (Holotypus in Herb. Kew.) ; edge of River Molonglo, Canberra, *G. H. Spare* 3941, 9.11.1941.

Radical leaves palmatisect, 1·5–5 cm. broad, with segments 2–6 mm. wide, glabrous or with a few scattered hairs above, sparingly pilose below, petioles 4–18 cm. long, thinly pilose or subglabrous, basal sheaths pilose ; upper cauline leaves linear, 1–2 cm. long, with a broad hyaline glabrous sheathing base. Flowering stems, slender erect, 10–25 cm. high, with 2–4 flowers, ± pilose under the flowers and glabrous or subglabrous below. Flowers golden, 1·5–2·0 cm. diameter ; sepals 5–6, oblong to ovate, blunt or obtuse, ± hooded, sometimes 1 or more obovate and ± bilobed, glabrous or ± shortly hispid on the back, with 3–5 nerves branched mainly in the upper $\frac{1}{2}$–$\frac{1}{3}$; petals, 5–9 elliptic to oblanceolate, obtuse to subacute, narrowed below into a very short claw, nectary $\frac{1}{10}$–$\frac{1}{5}$ the petal length above the base, with a semilunar glandular region in a short pocket surmounted by a short truncate lobe ; stamens about 30–40 ; carpels about 40–50. Mature achenes about 2 mm. long, semicordate to broadly subcuneate, with a slender erect to reflexed stylar beak $\frac{1}{2}$–$\frac{2}{3}$ as long, lateral faces with an undulate warty surface and a rounded irregular marginal ridge, abaxial surface broad, flattened and

with an irregular warty surface. Receptacle with a few long hairs among the achenes and glabrous or sometimes with an occasional hair in the staminal zone. (Figs. 14; 16, **2**).

I am greatly indebted to Mr. C. W. E. Moore for the fresh collection of this species, made at my request, which will enable isotypes to be placed at Canberra and other Australian herbaria. The plants were "growing in a small depression covering an area of perhaps $\frac{1}{2}$–$\frac{3}{4}$ acre, usually waterlogged in winter, but more or less dry in summer. The soil is a deep grey loam to clay loam with a fairly high organic matter content especially in the A horizon. The most abundant associated species is *Juncus fockei* Buchen."

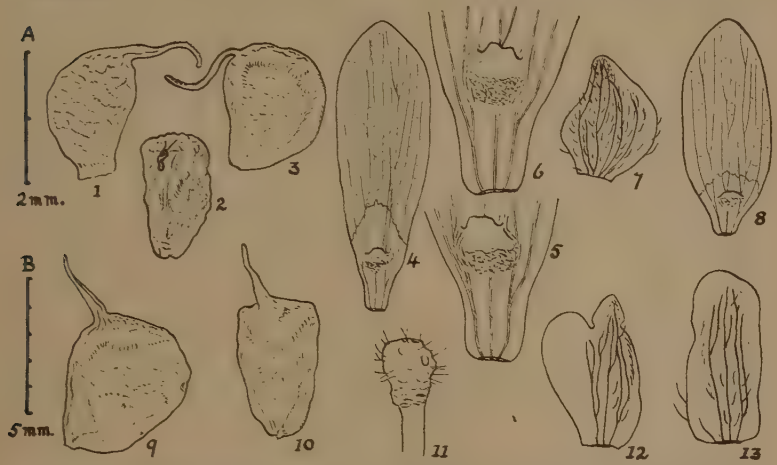


FIG. 14. *Ranunculus papulentus* Melville. 1, immature, 2, 3, 9, 10, mature achenes; 4, 8, petals; 5, 6, nectaries; 7, 12, 13, sepals; 11, receptacles; 1–7 from C. W. E. Moore 3054, Canberra, A.C.T., 17.1.1955, type; 8–13 from G. H. Spare 3941, Molonglo River, Canberra, A.C.T., 9.11.1941. Scales: 1–3, 5, 6, 9, 10, A; 4, 7, 8, 11–13, B.

16. **R. undosus** *Melville*, sp. nov.; *R. inundato* R. Br. ex DC. affinis, sed lobis foliorum latioribus apicibus late bi- vel tri-dentatis, lateribus acheniorum eleganter et regulariter in liras exstructis, nectariis truncatis et receptaculis inter achenia et stamina hispidis differt.

Folia radicalia palmatisecta, 2–6 cm. diametro, segmentis latis apicibus late bi- vel tridentatis, supra glabris vel subglabris, subtus sparse pilosis, petiolis longis 3 18 cm.; caules 12–30 cm. alti, erecti, 2-5-flori; flores 2-2·5 cm. diametro, sepalis 5, oblongis vel obovatis obtusis, glabris vel sparse pilosis, petalis 5–11, aureis, oblongis vel obovatis, cuneatis, apicibus obtusis vel rotundatis, lobis nectariorum truncatis vel arcuatis; stamina circa 30–40; ovaria circa 40–60; achenia circa 2 mm. longa, rostris tenuibus praedita, sublenticularia, semi cordata vel late subcuneata; latera acheniorum eleganter et regulariter in liras exstructa; receptacula inter achenia longe hispida, inter stamina breviter hispida.

NEW SOUTH WALES. Balranald per Glenfield Veterinary Research Station, Jan. 1939 Holotypus in Herb. Kew.); Liverpool Plains, *C. Moore*, 5, 1867; McIntyre River, Comm. W. Pamplin, n.d.

Radical leaves palmatisect, 2–6 cm. broad with segments 2–9 mm. wide (or linear acute, 1–3 mm. wide on aquatic plants), the ends of the lobes broad and tridentate, upper surface glabrous or with a few scattered hairs, lower surface sparingly pilose, petioles 3–18 cm. long glabrous to thinly pilose, basal sheaths subglabrous to pilose. Cauline leaves palmatisect to linear with 1–2 divaricate lobes, basal sheaths broad, hyaline, the lobes ± pilose (or glabrous in submerged plants). Creeping stems rooting at the nodes. Flowering stems 12–30 cm. high, slender, erect, with 2–5 flowers, glabrous to sparingly pilose below the flowers, glabrous to pilose at the base. Flowers golden, 2–2·5 cm. diameter, sepals 5, oblong, blunt to obovate, glabrous or sparingly pilose on the back, with 3–4 nerves often much branched above; petals 5–11, oblong to obovate cuneate, apex obtuse to rounded, with the nectary about $\frac{1}{1\frac{1}{2}}$ petal length above the base, having a truncate or arched lobe looped to the petal and forming a short pocket; stamens about 30–40; carpels about 40–60. Mature achenes, about 2 mm. long with the slender stylar beak $\frac{1}{2}$–$\frac{3}{4}$ as long, sublenticular, semicordate to broadly subcuneate, the lateral faces with a ripple pattern of numerous distinct rounded ridges, the slender marginal ridges forming a distinct keel on the abaxial surface. Receptacle with fairly numerous long hairs among the achenes and fairly numerous, slightly shorter ones in the staminal zone. (Fits. 15; 16, **1**.

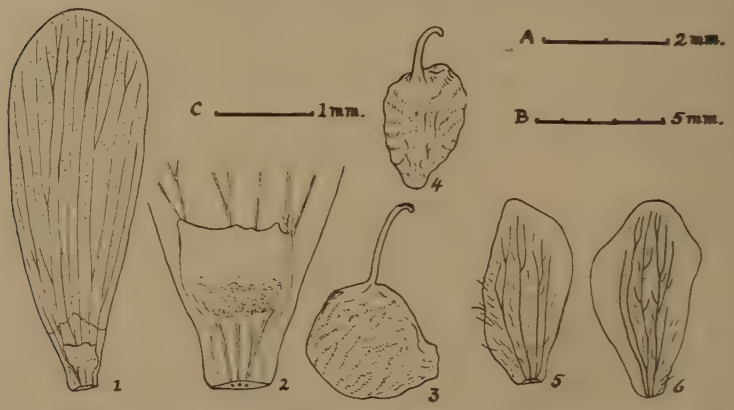


Fig. 15. *Ranunculus undosus* Melville. 1, petal; 2, nectary; 3, 4, mature achenes; 5, 6, sepals: all from Balranald, per Glenfield Veterinary Research Station, Jan. 1939, type. Scales: 3, 4, A; 1, 5, 6, B; 2, C.

17. **Ranunculus rivularis** *Banks et Solander ex DC.* in Syst. Veg. **1,** 270 (1817).

This species was described from New Zealand material, but comparison of the type specimen with both New Zealand and Tasmanian specimens revealed no important differences. J. D. Hooker in the Flora Novae Zelandiae (1853) maintained the name for the New Zealand plants, but in the Flora Tasmanica (1860) he mistakenly took up the name *R. inundatus* R. Br. ex DC. for those of Tasmania. Bentham increased the confusion by lumping together in the Flora Australiensis (1863) *R. glabrifolius* Hook., *R. inundatus* R. Br. and *R. inconspicuus* Hook. f.

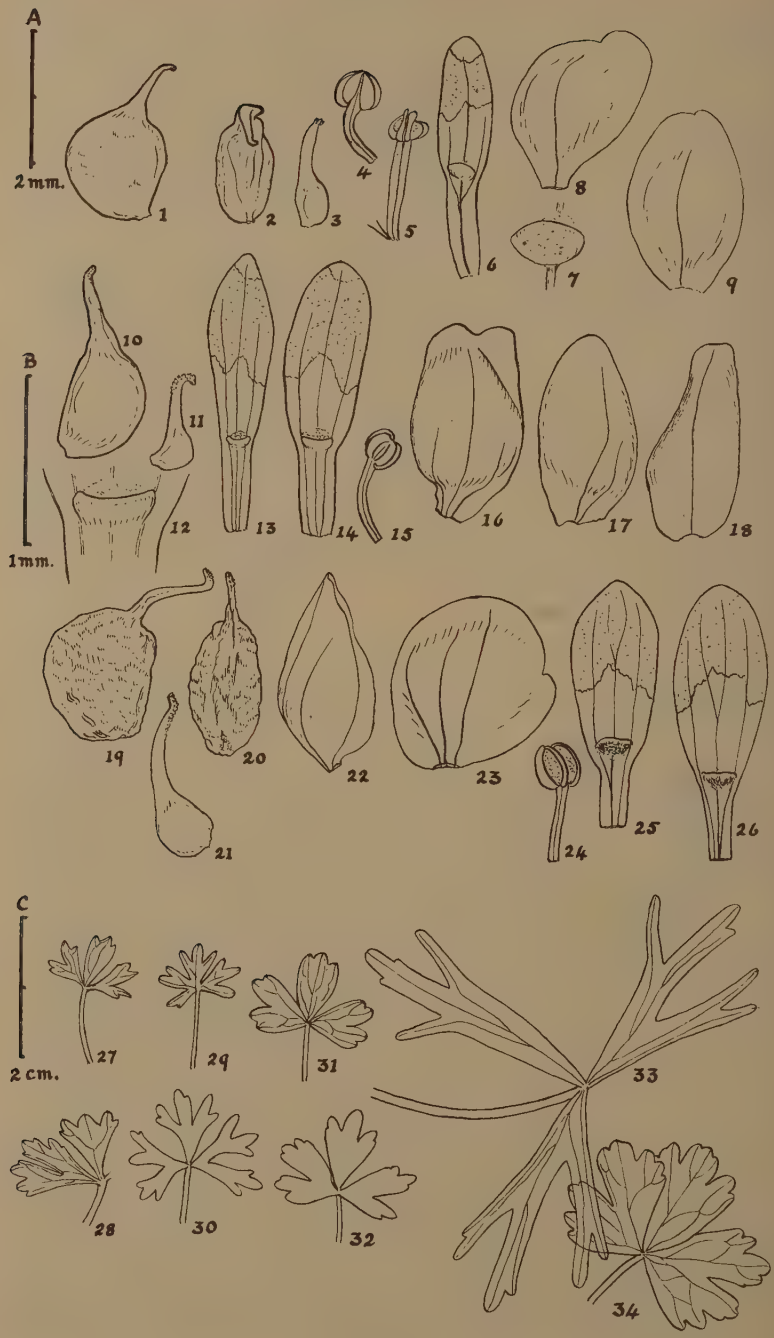
with the true *R. rivularis*, which he consigned to lower rank as *R. rivularis* var. *subfluitans* Benth.

The type of *R. amphitricha* Colenso (Trans. N.Z. Inst. **17,** 237, 1885) proved on examination to be conspecific with *R. rivularis*. The girdle of stiff hairs at the base of the receptacle is common to both and the petals, in spite of Clenso's statement that they are uni-nerved, were found to have three nerves. The lateral nerves were smaller than usual, however, and difficult to see. All the sepals on the Colenso plants were uni-nerved, whereas the number is usually three, but varies from 1–3 in some collections. The characters of the nectaries and achenes, which were not quite ripe, conformed with those of *R. rivularis*, except that the stigmatic papillae were confined to an apical tuft instead of extending for some little distance down the style (Fig. 17, **3**).

Fig. 16. *Ranunculus* leaves. 1, *R. undosus* Melville from the type ; 2, *R. papulentus* Melville from the type ; 3, *R. inundatus* R. Br. ex DC. from Melville 2149, Sale, Victoria ; 4, characteristic, 5, early leaf of *R. glabrifolius* Hook. from Gunn 157, Launceston, Tasmania, 9.11.1844.

This is a somewhat polymorphic species, its variability depending to some extent on differences in the wetness of its habitat. In deep water it may be submerged, with slender stems and rather finely dissect leaves, in shallow water, the stems may run over the bottom, rooting at the nodes and sending up leaves and stems into the air and on damp soil around the margins of pools the habit may be similar, but the leaf segments become broader and the internodes shorter with the drier conditions. Characteristic leaf shapes are shown in Fig. 17, **27–34**. The 4–5 sepals are deeply concave, hyaline to green backed, with 1–3 nerves and one or more slightly bilobed to emarginate. The 5–9 petals are linear strap-shaped to oblanceolate, blunt, 3–4 mm. long, 0·7–1·2 mm. broad, pale golden in colour, sometimes unzoned, sometimes with a starch containing zone in the upper half and the tip free, with 3 nerves, the central one sometimes forked. The nectary is a tumid semilunar pocket or bracket placed about $\frac{1}{3}$ the petal length above the base with the petal claw slightly contracted below. Stamens about 15 ; carpels about 10 with a slender style having stigmatic papillae for about $\frac{1}{3}$ its length or confined to the tip. Achenes sublenticular, body about 2 mm. long, rather abruptly contracted into a slender beak about as long, obscurely rugose when mature (Fig. 17, **19, 20**).

New Zealand and Tasmanian specimens resemble one another closely but plants collected near the mouth of the Glenelg River in S.W. Victoria have the segments of the aerial leaves broader and overlapping with the


A
2 mm.
1
2
3
4
5
6
7
8
9
B
1 mm.
10
11
12
13
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C
2 cm.
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margins of the terminal lobes convex instead of straight or concave. (Fig. 17, **31, 32, 34**). The petals are oblanceolate about 4 mm. long and 1·5 mm. broad and generally have the median nerve bifurcate. The slightly larger size of leaves and petals suggested the possibility of polyploidy, but a comparison of the pollen grains and the stomata with those of Tasmanian and New Zealand plants did not support this. Aerial leaves of other Victorian collections are broader than in their Tasmanian counter-parts in this respect and the mainland populations appear to diverge from those of Tasmania.

18. **Ranunculus glabrifolius** *Hook.* in Hook. Journ. Bot. **1,** 243 (1834).

W. J. Hooker described this species from flowering material collected by Gunn in 1833 in Tasmania (No. 157), but no precise locality is recorded. The leaves were described as glabrous, but even on the type specimens there are quite numerous appressed strigose hairs on the lower surface of some leaves, and occasional hairs on the upper surfaces and margins as well. Hairs are present on the petioles also. Other collections usually possess some hairs on the leaves. Mounted on the same sheet as the type is a second gathering of Gunn, 157, without date or locality, which is the type of Hooker's var. *gracilior* (Comp. Bot. Mag., **1,** 273, 1835). The variety was distinguished by its elongate petioles and the longer, much more acuminate leaf segments. At the same time Hooker recorded the formation of root tubers giving off runners, described the achenes as nearly globose, wrinkled and longer than the beak and observed that a few scattered hairs may be present on the leaves. Unfortunately, all the achenes have fallen off and have been lost and there are no flowers, nevertheless, I am satisfied that this is a form of *R. glabrifolius*. It has the appearance of having grown in shallow water, whereas the type specimens of var. *glabrifolius* appear to have grown in drier conditions, perhaps in short grass or other herbage.

R. glabrifolius is maintained by J. D. Hooker in the Flora Tasmanica, though Bentham in the Flora Australiensis treats it as var. *major* of *R. rivularis* Banks & Solander. There are only superficial likenesses between *R. rivularis* and *R. glabrifolius*, greatest between the dissect leaves of forms of the latter growing in water and corresponding forms of *R. rivularis*. The tips of the leaf segments are normally blunt and rounded in *R. rivularis*, but more or less acute in *R. glabrifolius*. The nectaries on the petals are of different types and the sculpturing and proportions of the achenes are quite distinct. *R. glabrifolius* has a nerve stretching obliquely across the face of the achene, absent from *R. rivularis* and which I have observed elsewhere only in *R. collinus* R. Br. The stems and leaves of *R. rivularis* are quite glabrous, but they are more or less hairy in *R. glabrifolius*, which is without the crown of stiff hairs below the carpels that is usually present in *R. rivularis*.

FIG. 17. Variants of *Ranunculus rivularis* Banks & Solander ex DC. 1, 2, 10, immature, 19, 20, mature achenes ; 3, 11, 21, carpels ; 4, 5, 15, 24, stamens ; 6, 13, 14, 25, 26, petals ; 7, 12, nectaries ; 8, 9, 16–18, 22, 23, sepals ; 27–34, leaves ; 1–9, 27, 28, from Norsewood, Waipawa County, New Zealand, W. W. Colenso, type of *R. amphitricha* Colenso ; 10–18, 29, 30, from Melville 2348, Florentine Valley, Tasmania ; 19–26, 31—34 from Melville 1559, Long Swamp, Mouth of Glenelg River, Victoria. Scales : 1–6, 8–11, 13–26 A ; 7, 12, B ; 27–34, C.

R. inundatus R. Br. and *R. incisus* Hook. f. (Fl. Nov. Zel. **1,** 10, t. 4) were cited by Bentham as synonyms of *R. rivularis* var. *major*. *R. inundatus* is a distinct species, but after examining the syntypes of *R. incisus* I consider that it is conspecific with *R. glabrifolius*. Both in Tasmania and in New Zealand there is a considerable variation in the size of the plants. After allowing for variations due to habitat differences, the plants appeared to fall into two size ranges. Fragments of leaves were taken from several plants in each size range, cleared in chloral hydrate solution and the lengths of the stomata along the guard cells were measured. The results are presented in Table I.

Table I. Lengths of the guard cells of stomata in *R. glabrifolius*.

specimen	range μ.	mean μ.
Tasmania		
Gunn 157, 9.11.44 Launceston	47–55	52
Comber 1916, Ellendale	45–57	52
Gunn 157, 9.11.44, Launceston	47–57	52
Gunn 157, 16.11.44 St. Patrick's River ...	45–53	47
Hooker 1089	32–43	36
Gunn 157/1833 (Type.)	32–40	37
Gunn 157, var. *gracilior* (Type)	40–43	41
New Zealand		
Colenso 4271	32–40	36
Colenso 1940	37–48	43
Colenso (with Monro 43)	40–43	42
Travers –/1880	45–58	52
Colenso 1919 (*R. incisus* syntype)	37–45	42
Colenso 1912 (*R. incisus* syntype)	47–55	50

There are clearly two groups of stomatal sizes, one with means ranging from 36–43 microns, presumably diploid plants, and the other with means ranging from 47–52 microns, presumably tetraploids. The type specimen of the species is a presumed diploid and so, too, is that of var. *gracilior* Hook., which for the reasons given above appears to be no more than a phenotypic variant. Among the syntypes of *R. incisus* are plants belonging to both stomatal groups. In the New Zealand material it is not always possible to separate the two groups on gross morphological characters and it is doubtful if this can be done in the Tasmanian populations. In some plants the stamens appear to be without pollen, so that triploids may occur. Field and experimental work on this species is greatly to be desired before any splitting up into varietal or other units is attempted. Some differentiation seems to have taken place between the Tasmanian and New Zealand populations, the New Zealand plants being generally smaller, more slender and less hairy. Their habit is shown correctly in the Flora Novae Zelandiae, t. 4, where the dissections are not critical. In presumed diploids the petals are oblanceolate, blunt, but the breadth and number of the nerves increases in presumed tetraploids, the shape becoming broadly oblanceolate or obovate. The following description covers the Australian forms.

Radical leaves palmatisect, 7–50 mm. broad, the terminal lobe broadly cuneate and deeply trisect with acute apices and a few acute teeth, to narrowly cuneate and 3-toothed at the apex, or in small leaves (? from

dry habitats broadly obovate cuneate with obtuse teeth, glabrous to sparingly hirsute above, glabrous to hirsute below, petioles 1–20 cm. long, glabrous to sparingly hirsute. Cauline leaves linear to linear lanceolate or trifurcate. Flowering stems 2–30 cm. high, erect, 1–3 flowered, glabrous to appressed hirsute below the flowers. Flowers 15–25 mm. diameter: sepals 5, oblong to ovate blunt, concave, sometimes produced into a beak, appressed hirsute on the back, with 3 principal nerves branching in the lower half: petals 5–10: golden, obovate to oblanceolate, cuneate, apex rounded, nectary about $\frac{1}{3}$ the petal length from the base, having a deep pocket with its margins adherent to and excurrent on the petal, apex of the lobe concave or sinuous, claw somewhat thickened below the nectary: stamens about 30–40: carpels about 15–20. Achenes 2·5–3 mm. long, with a beak about $\frac{1}{2}$ as long, semi-orbicular to broad obovate, subcuneate, tumid, with the lateral faces coarsely undulate with 3–4 rounded ridges. Receptacle glabrous, or sometimes with 1 or 2 hairs between the achenes. Figs. 18: 16. **4, 5**.

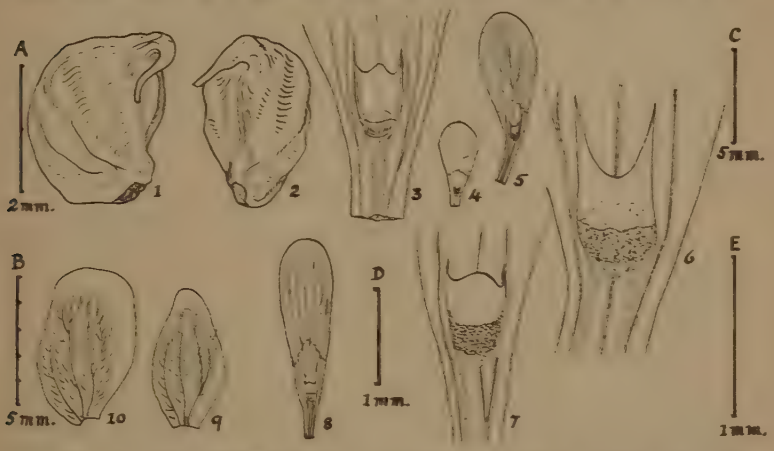

Fig. 18. *Ranunculus glabrifolius* Hook. 1, 2, achenes: 3, 6, 7, nectaries: 4, 5, 8, petals: 9, 10, sepals: 1, 2, from Archer, Tasmania, undated: 3, 4, 9, 10 from Gunn 157, St. Patrick's River, Tasmania, 16.11.1844: 5, 6, from W. Colenso 1912, New Zealand, undated, syntype of *R. initus* Hook. f.: 7, 8, H. F. Comber 1916, Ellendale, Tasmania, 20.12.1929. Scales: 1, 2, A: 9, 10, B: 4, 5, 8, C: 7, D: 3, 6, E.

19. **R. collinus** *R. Br. ex DC.* in Syst. Veg. **1,** 271 1817.

After the first publication of this species by De Candolle, it was redescribed and figured by J. D. Hooker in the Flora Tasmanica **1,** 9, t. 2B, 1855 as *R. inconspicuus*. The figure represents the habit accurately, but the critical features of the achenes are omitted. Bentham in the Flora Australiensis **1,** 14, 1863 consigned *R. collinus* to synonymy under *R. parviflorus* L.* and at the same time reduced *R. inconspicuus* to varietal rank as *R. ricularis* Banks & Solander var. *inconspicuus*. Its true affinity appears to be with *R. glabrifolius* Hook., the achenes being so much alike that it was necessary to consider whether both plants should be regarded

* There is a single minute plant of one of the *R. parviflorus* group, bearing a single achene, occurring as an accidental admixture in this gathering, which, presumably, accounts for Bentham's action.

as varieties of one species. *R. collinus* grows in Tasmania in subalpine situations among small herbs only a few inches high, in places where there is a seepage of water over the ground. Under these conditions, the outermost leaves of the rosette of *R. glabrifolius* resemble rather closely those of *R. collinus*, but the later formed leaves are always cut into linear segments, which does not happen in *R. collinus*. Plants of *R. glabrifolius* grown in wetter situations produce only the leaves with linear segments. There are, then, differences in the leaf spectra. Here, in *Ranunculus*, as in other genera, the first formed leaves of related species are most alike and those formed later are most divergent. It follows that the later formed leaves have the greater value in the discrimination of species.

FIG. 19. *Ranunculus collinus* R. Br. ex DC. 1, 2, 6, 8, 9, achenes ; 3, sepal ; 4, petal fragment ; 5, leaf ; 10, sepal ; 11 nectary ; 12, petal; 1–5 from R. Brown 5256, Table Mountain, Tasmania, type ; 6-12 from Melville 3096, Head of Timbarra River, Gippsland, Victoria, 25.1.1953. Scales : 1–4, 6, 8, 9, A ; 5, B ; 7, 10, 12, C ; 11, D.

In the present species pair, the later formed leaves are very dissimilar (Figs. 16, **4, 5** ; 19, **5**), conforming with the view that they are in fact distinct species. *R. collinus* has the nectarial pocket generally shallower and its margins often are not excurrent on the petal, the fruiting peduncles are recurved whereas they are erect in *R. glabrifolius*. Plants collected at the head of Mason's Creek, above the Nunniong Plains in East Gippsland (Melville No. 3096) were much larger than Tasmanian specimens (Melville No. 2271). The length of the stomatal guard cells varied from 40–50μ in both collections, so that there was no evidence of polyploidy and the differences are probably due to climate. An amplified description follows.

Stems creeping, rooting at the nodes and producing a rosette of leaves. Leaves 3–28 mm. broad, with 3 oblanceolate to broadly obovate-cuneate lobes, the median one with usually 3 subequal acute to blunt teeth in the upper quarter, upper surface with scattered appressed hairs, more numerous below, petioles 5–60 mm. long, with appressed to ± spreading

hairs. Flowering stems 0·5–10 cms. tall, erect, usually one flowered, recurved in fruit, indumentum as petioles. Flowers bright golden, 10–15 mm. diameter ; sepals 4–5, broadly elliptic to obovate, concave, ± hyaline usually 3 nerved, with rather stiff appressed hairs on the back ; petals 6–11, oblanceolate, blunt, 6–9 mm. long, with a nectary $\frac{1}{5}$–$\frac{1}{4}$ of the petal length above the base ; nectary lobe semicircular, with the margins sometimes ± excurrent on the petal ; stamens about 25–30 ; carpels 10–15. Body of achenes 2 2·5 mm. long, tumid, with 2–3 oblique lateral to nearly longitudinal ridges on each face marking the course of lateral nerves, beak reflexed, about $\frac{1}{3}$ as long as body. Receptacle sparingly hispid between the achenes, glabrous in the staminal zone. (Fig. 19).

Key to the *Ranunculi* discussed above.

Nectary a tumid semilunar bracket without a distinct petaloid lobe

Leaves palmatisect, segments linear in submerged to cuneate or obovate cuneate in aerial leaves. Nectary $\frac{1}{3}$ above base of the strap-shaped petals, achene ± rugose . . . . . 17. *rivularis*

Leaves elliptic cuneate with 3 blunt teeth in upper $\frac{1}{3}$ or 3-lobed, petals elliptic with golden patch at tip, achenes short pedicellate 10. *triplodontus*

Leaves pinnate, pinnatisect, or ternate with broad lobes.

Leaves pinnatesect with linear segments

Terminal lobes trifid, laterals bifid, petals creamy white 12. *millani*

Leaves simple linear or 3-fid . . . . . 13. *setaceus*

Leaves pinnate or ternate with broad lobes

Terminal lobes of leaves narrow to broad cuneate, petals obovate cuneate, golden, about 6 mm. long, nectary $\frac{1}{4}$ above base 9. *nanus*

Terminal lobes of leaves broad, 3-lobed, petals not golden, 2–3·5 mm. long

Terminal lobes and lateral leaflets overlapping, petals narrow elliptic, nectary $\frac{1}{3}$ above the base, 5 nerves above the nectary . . . . . 7. *concinnus*

Lateral leaflets distant, ± sharply tri-dentate, petals linear, nectary $\frac{1}{2}$–$\frac{2}{3}$ above the base, 1–3 nerves above the nectary . 8. *decurvus*

Nectary with a distinct petaloid lobe developed, often ± attached at the margins forming a pocket.

Sepals reflexed

Leaves ternate, leaflets deeply lobed, teeth ± acute . 2. *plebeius*

Leaves trilobed or if ternate the lobes broad and teeth obtuse 3. *scapigerus*

Sepals spreading

Leaves ternate or pinnately cut or lobed.

Leaves pinnate

Lateral leaflets broad, ovate, dentate, nectary lobe free, rounded triangular, often obliquely fixed . . . 4. *pimpinellifolius*

Lateral leaflets lanceolate-elliptic entire, divergent, some simple elliptic acute leaves, nectary lobe free, semicircular to rounded oblong . . . . . 5. *pascuinus*

Leaves ternate or ternately cut or lobed.

Petals 5, obovate cuneate, broad.

Leaf segments linear to linear lanceolate, nectary lobe free, triangular to tongue-shaped . . . . . 6. *ligulatus*

Leaf segments broader, leaf orterminal leaflet deeply trilobed

Lateral segments of leaf or leaflets forwardly directed, nectarlobe cuneate truncate, stems many-flowered, achenes with long slender beak coiled at the tip 1. *lappaceus*

Lateral segments of leaflets wide spreading, nectary lobe ± tapering, emarginate to truncate, stems uniflorous, achenes with stout arching beak . . 11. *graniticolus*

Petals 6–11, narrow obovate or oblanceolate, leaves ternate with lobes tridentate, achenes with 3–4 coarse undulations on each face.

Early leaves only ternate, later palmatisect, nectary lobe forming a deep pocket with margins ± excurrent on the petal . . . . . 18. *glabrifolius*

Leaves all ternate, nectary lobe forming a shallow pocket with margins not or slightly excurrent on the petal 19. *collinus*

Leaves palmatisect or palmatifid.

Mature achenes with 3–4 coarse undulations on each face, sepals hispid, receptacle glabrous or few hairs between the achenes 18. *glabrifolius*

Mature achenes with a ripple pattern of many small rounded ridges, sepals hispid, receptacle long hispid between the achenes and shorter hispid in the staminal zone . 16. *undosus*

Mature achenes with obscure, irregular, warty ridges

Leaf segments slender linear, usually about 1 mm. wide, sepals glabrous, receptacle glabrous between the achenes, ± densely short hispid in the staminal zone . 14. *inundatus*

Leaf segments 2 mm. or more wide, sepals hispid, receptacle long hispid between the achenes, glabrous in the staminal zone . . . . . 15. *papulentus*

A REVISION OF THE GENUS BRACHYCORYTHIS.

V. S. Summerhayes

Historical

The genus *Brachycorythis* was proposed by Lindley in 1838 in his general account of the " Genera and Species of Orchidaceous Plants " (p. 363). It was based on a plant collected in South Africa by Drège and was characterised by the structure of the labellum (especially the inflated base or hypochile, which Lindley compared with the similar structure in the genus *Stanhopea*) and the bluntly galeate perianth which is inserted very obliquely.

Further species were added by Harvey and the younger Reichenbach but the latter gave no exact description of his concept of the genus, though as he transferred to it two species of the genus *Schizochilus* (Flora, **50,** 116 7 : 1850), a genus which has been considered distinct by almost all the other authors, it appears that he took a broad view of *Brachycorythis*.

In their Genera Plantarum (**3,** 632 : 1883) Bentham and J. D. Hooker again separated *Schizochilus* from *Brachycorythis*, a step well justified by the very different habit and floral structure of the two groups ; this view was also adopted by Pfitzer in Die Natürlichen Pflanzenfamilien (**2,** abt. 6, 97 : 1889). Both these authors seem to have excluded *B. tenuior* Rchb. f. and *B. macowaniana* Rchb. f. from *Brachycorythis* on account of the presence of a spur to the labellum, and Pfitzer presumably included them in *Platanthera* though he nowhere mentions either species.

In 1895 Schlechter (Engl. Bot. Jahrb. **20,** Beibl. l. pp. 12–14) pointed out that the genus was wrongly placed in the *Diseae* by Bentham and Hooker and Pfitzer and that it is closely allied to the genus *Platanthera*. He seems to have taken a broad view of this genus, since he also includes *Schizochilus*. He was influenced in this broad view by the occurrence of spurs in the two species mentioned just above. At the same time he created a new genus, *Neobolusia*, to contain the rather anomalous species *Brachycorythis tysoni* Bolus. There is no doubt that Schlechter was right in his recognition of the affinity of *Brachycorythis* with *Platanthera*, with which it agrees in many features. It may, however, be separated by the peculiar habit, the tall slender column and the marked tendency for the petals to be united to the lower part of the column.

In 1898 the genus was dealt with more or less simultaneously by Rolfe (Dyer, Fl. Trop. Afr. **7** : 200–205) and by Kraenzlin (Orch. Gen. et Sp. **1,** 536–549). Rolfe restricted his concept of the genus to those species with a boat-shaped or hollowed-out but not spur-like labellum hypochile, while he placed the spurred species in *Platanthera*, in which genus he also included the West African *Gymnadenia macrantha* Lindl. Kraenzlin, on the other hand, though he excluded *Schizochilus* and *Neobolusia*, included both spurred and non-spurred species in *Brachycorythis*. He pointed out, quite correctly, that no line of demarkation can be drawn between these two types and included at least one new species, *B. congoensis* Kraenzl., which is clearly intermediate as regards spur development. He decided, however, that it is more satisfactory to keep the genus distinct than to merge it into either *Habenaria*, *Platanthera* or *Gymnadenia*.

Shortly afterwards (Engl. Bot. Jahrb. **28,** 177 : 1900) Kraenzlin described the genus *Schwartzkopffia*, based on a plant from Togo in West Africa. He made no comparison with *Brachycorythis* and apparently did not recognise the affinity of his new genus with that genus.

Dealing with the South African species of the genus in Flora Capensis (**5,** iii. 84–89 : 1912) Rolfe maintained much the same views as in the Flora of Tropical Africa, except that he replaced *Neobolusia* into *Brachycorythis* ; the spurred species (*B. tenuior* and *B. macowaniana*) were referred to *Platanthera*.

In 1921, however, Schlechter carried out a comprehensive investigation of the whole group as a result of which he maintained *Schizochilus* and *Neobolusia* and divided *Brachycorythis* (in its wider sense) into four genera. One of these is *Schwartzkopffia* Kraenzl., which he showed clearly is congeneric with *Brachycorythis pumilio* (Lindl.) Rchb. f. and *B. lastii* Rolfe. This genus is characterised by its leafless habit, the numerous leaves on the stem of the typical *Brachycorythis* being replaced by brownish cataphylls, and the presumably saprophytic mode of nutrition. The flowers are also very much reduced in number, often to 2 or 3 only and the whole plant is very short and stunted.

The remainder of the species, spurred and unspurred, were allocated to three genera differing, according to Schlechter, in the structure of the column as well as the labellum. *Brachycorythis* proper has spurless flowers, petals united to the column, and naked viscidia, *Gyaladenia* Schltr. includes species with short spurs, a short column with free petals and naked viscidia and is allied to *Gymnadenia*, while *Diplacorchis* Schltr. includes species with long-spurred flowers and the viscidia are stated to be placed in bursicles similar to those in *Orchis*, the sides of the hypochile being decurrent on to the epichile as tall plates terminating abruptly in front. *Diplacorchis* was considered by Schlechter to be more closely allied to *Orchis* than the other two genera.

In 1925 Braid (Kew Bull. **1925,** 353–361) reviewed Schlechter's account but, although he proposed some new species and varieties and expressed doubts about some of those recognised by Schlechter, he accepted the main lines of Schlechter's classification.

In the Genera Plantarum of Bentham and Hooker (**3,** 626 : 1883) ten sections are enumerated under the genus *Habenaria*, of which no. 8 is called section *Phyllostachya* Benth. This contains several Asiatic species as well as the African *Gymnadenia macrantha* Lindl., already mentioned. It is characterised by the leafy stems in which the bracts are scarcely differentiated from the upper leaves, the flowers being borne in the axils of these leafy bracts ; the labellum lamina is broad, the spur is conical with a broad mouth and the column with parallel loculi more like *Platanthera* than *Gymnadenia*. This group was maintained as a section of *Habenaria* by J. D. Hooker in the Flora of British India (**6,** 132, 163–164 : 1891) containing three Indian species.

In his account of the orchids of China and Japan (Fedde Repert. Spec. Nov. Beih. **4,** 118–120 : 1919) Schlechter raised Bentham's section *Phyllostachya* to generic rank giving it the name *Phyllomphax* and including two additional Chinese species, over and above the Asiatic and African species already included by Bentham. He differentiated the genus from

the allied genus *Platanthera* on account of its habit and the tall slender column, but pointed out that it shares both these characters with *Brachycorythis*, with which he suggested it is even more closely allied. In this connection it is interesting to note that many years before Bolus, in figuring *Brachycorythis tenuior* (as *Platanthera tenuior*, Ic. Orch. Austr.–Afr. **1,** t. 61 : 1896) says " This species is a South African representative of the group of East Indian orchids which Sir Joseph Hooker, in the Flora of British India regards as *Habenaria*, and has called *Phyllostachya* . . . . ".

When I dealt with these various genera in my treatment of the West African orchids (Hutch. & J. M. Dalz. Fl. W. Trop. Afr. **2,** 405 407 : 1936) I maintained the genera recognised by Schlechter, but with the discovery of *Diplacorchis conica* Summerh. and *Brachycorythis paucifolia* Summerh., the availability of further material of *Brachycorythis congoensis* Kraenzl. and *B. hirschbergii* Braid and finally the discovery of the plant called in this account *B. conica* subsp. *transvaalensis* I have become increasingly doubtful of the distinctions between the genera separated from *Brachycorythis* by Schlechter, that is, *Cyaladenia* and *Diplacorchis*. I have also for many years had considerable doubts as to the validity of many of the species recognised by Schlechter in his revision.

The gradual accumulation of material in liquid preservative of a wide range of species belonging to many of the groups of *Brachycorythis*, *Diplacorchis* and *Phyllomphax* has at last made it possible to re-examine these genera with special reference to the column differences on which Schlechter based his views.

On careful examination of such material of over twenty species I have been quite unable to find the distinctions described by Schlechter. In all the species I have examined, including material referable to *Diplacorchis tenuior*, *D engleriana*, *D. rhomboglossa* and *D. angolensis*, the viscidia are *quite naked* and there are no signs of any bursicle or similar structure. In a number of species the rostellum is very massive at the sides of the middle lobe forming short but fleshy lateral lobes in which, on removal of the viscidia, small cavities are left. As in all groups of the *Ophrydeae* the viscidium is formed from the rostellum and a thin covering portion comes away with the pollinium ; this may have given Schlechter the impression of a bursicle. It is interesting to note that the best examples of this structure are found in *B. kalbreyeri* Rchb. f. and *B. schweinfurthii* Rchb. f. which would be considered on other grounds to be characteristic members of *Brachycorythis*. I could also see no essential differences in the structure of the column of the *Gyaladenia* species though admittedly I have seen spirit material of *G. rhodostachys* only. The structure of the column in the species of *Phyllomphax* seems almost identical with that in many species of *Brachycorythis* except that the auricles (so-called staminodes) are usually more or less bilobed instead of entire and the rostellum, though of the same general shape, is on the whole smaller.

With regard to the presence or absence of a spur, almost all intermediates may be found between the long spurs found in species like *B. tenuior* and some of the species of *Phyllomphax* and the spurless hypochile occurring in *B. ovata* Lindl. (the type species) and *B. pleistophylla* Rchb. f.

The decurrence of the sides of the hypochile on to the epichile is also a very variable feature and again practically all intermediates can be

found between the high abruptly terminating plates of species like *B. tenuior*, and species like *B. buchananii* where there is no decurrence at all but the sides of the hypochile are continued as the margins of the epichile.

In view of the results of my examination I find myself with no alternative but to amalgamate all these genera (with the exception of *Schwartzkopffia*) under the earliest name *Brachycorythis*.

Classification and Evolution

Apart from the separation of the genera *Diplacorchis* and *Gyaladenia*, Schlechter separated *Brachycorythis* into four sections characterised by vegetative and/or labellum characters. As a result of my investigations I do not feel that it is possible to maintain these groups, or to substitute any other grouping in their place. Schlechter's groups are either assemblages of not very closely allied species, as, for example, his sections *Eu-brachycorythis* and *Microcorythis*, or are given a false idea of magnitude by the excessive splitting of species so that one or two species are converted into an impressive looking group of allied species, such as his other two sections *Dasycorythis* and *Calocorythis*.

My general impression on looking at the genus is that it consists of a series of species which show several lines of development from original adaptation to mesophytic conditions towards greater and greater adaptation to savanna and grassland climates with considerable dry periods. There are obviously small groups of similar species within these general lines of development but I do not think that they can logically be separated into distinct sections.

There seems little doubt that the genus is allied to *Platanthera*, in its wide sense, and to *Gymnadenia* and that the species formerly placed in *Phyllomphax* (*Habenaria* sect. *Phyllostachya*) show the least divergence from other *Platanthera* and *Habenaria* types. In these plants the characteristic leafy habit, shown so well in such species as *B. ovata* Lindl. and *B. pubescens* Harv., in which there are large numbers of closely overlapping rather small lanceolate leaves and numerous flowers in a dense spike, is less well developed. The leaves are usually much larger, thinner in texture and not so closely imbricate. Some of the species are forest types growing in openings under relatively mesophytic conditions, particularly *B. helferi* (Rchb. f.) Summerh. and *B. macrantha* (Lindl.) Summerh. Others are adapted to montane grasslands in the same general region and these usually have smaller and more closely arranged leaves, for example, *B. henryi* (Schltr.) Summerh., *B. obcordata* (Lindl.) Summerh. and several southern Indian species. In all these species the petals are either quite free from the column or very shortly attached just above the base. The hypochile is always spurred, the mesophytic forest forms having the longest spurs and the presumably derived grassland forms usually having shorter and blunter ones, and approaching in this respect the more typical African species. This group has a wide distribution from West Africa to Formosa; it also occurs in areas containing many species of *Platanthera*, *Gymnadenia* and other similar genera. It appears that in *Brachycorythis* the well-developed spur, which in many orchid groups is looked upon as an advanced character, is more primitive and that development has taken place in the direction of a reduction of the spur

and its gradual replacement by a sac-like hypochile. Whether this is related in any definite way to differences in insect pollinators cannot be determined since nothing is known about insects visiting any of the species.

Starting from the above general basic group the other African species can be interpreted as derivations increasingly adapted to savanna conditions and showing in other respects certain evolutionary trends. Unfortunately nothing is known of the chromosome complements of any of the species of the genus. *B. conica* (Summerh.) Summerh. is clearly allied to *B. macrantha* in many features, but has small more or less closely imbricate leaves, its more southern subspecies closely resembling *B. ovata* vegetatively. It has, however, a rather long spur and the labellum is approximately of the " Phyllomphax " type. Species such as *B. sceptrum* Schltr. and *B. congoensis* Kraenzl. are evidently intermediate in characters. Both have the typical *Brachcorythis* vegetative habit, but the hypochile forms a large rounded spur ; the petals are united at their base to the column but not to quite the same extent as in *B. ovata*. The gradual reduction of the spur to a boat-like hollowed-out hypochile reaches its maximum development in species like *B. ovata* and *B. pleistophylla* which have also the characteristic foliage and in which the petals show the maximum fusion with the column. These are typically plants of savanna woodland or open grassland.

There seem to be two further developments in the direction of adaptation to such conditions, namely, the development of a thick velvety covering of hairs to the leaves or the suppression of the leaves altogether. The former is well shown in *B. pubescens* Harv., which has a wide distribution all over the savanna regions of Africa, and its allies *B. velutina* Schltr. and *B. pilosa* Summerh. The latter possesses the rounded spur-like hypochile found in *B. congoensis* and *B. sceptrum*, combined with velvety hairy leaves which are almost identical with those of the other two species mentioned above. The reduction of the leaves to scales is found in the genus *Schwartzkopffia*, which possesses the general floral structure of *Brachycorythis ovata*, and may reasonably be looked upon as a special development adapted to growth in periodically burnt savannas or short grass areas.

Clearly in such lines of evolutionary development there will be lateral branches or even reversal in individual cases. Species like *B. tenuior*, with a large spur which is, however, unlike that of other long-spurred species, enlargement of the decurrent hypochile sides to produce what appear to be insect guides together with the typical *Brachycorythis* habit, are evidently off the general line of evolution. Another tendency which is found in several groups within the genus is towards the concentration of the leaves near the base of the stem, a feature which is developed also in such diverse genera as *Habenaria* and *Satyrium*. Examples in *Brachycorythis* are to be found in *B. paucifolia* Summerh., which has a large rounded spur, and *B. basifoliata* Summerh. in which the hypochile is of the very shallow type found in *B. ovata* ; in other floral characters both are characteristic members of the genus. *B. angolensis* (Schltr.) Schltr. and *B. oligophylla* Kraenzl. have foliage leaves developed on separate sterile shoots much in the same way as certain groups of *Disa* and *Satyrium*.

Perhaps one of the most interesting members of the genus is *B. kalbreyeri* Rchb. f. which combines flowers exhibiting most of the more advanced characters of the genus, with vegetative characters very similar to those in the *Phyllomphax* type. This plant is not only an inhabitant of relatively mesophytic conditions but it occurs either as an epiphyte (the only one in the genus) or on rocks. This habit must, I think, be looked upon as a secondary development in view of the floral structure, and the pre-predominantly terrestrial nature of the whole *Ophrydeae*.

In the enumeration of the species I have tried to indicate the general evolutionary development of the genus, placing those species which I look upon as the more primitive first and finishing with the more advanced. It is, however, quite impossible to do this accurately using a linear sequence only, so no definite conclusions should be drawn from the *details* of the sequence.

An amended description of the genus, together with as complete synonymy as seems necessary, is provided herewith.

Brachycorythis *Lindl.* Gen. & Sp. Orch. 363 (1838) ; Benth. & Hook. f. Gen. Pl. **3,** 632 (1883) ; Pfitzer in Engl. & Prantl, Nat. Pflanzenfam. **2,** abt. 6. 97 (1889) ; Rolfe in Dyer, Fl. Trop. Afr. **7,** 200 (1898), pro maxima parte ; Kraenzl. Orch. Gen. et Sp. **1,** 536 (1898), pro maxima parte ; Rolfe in Dyer, Fl. Cap. 5, iii. 84 (1912), pro maxima parte ; Schltr. Die Orchideen, 70 (1914), et in Beih. Bot. Centralbl. **38,** ii. 103 (1921) ; Braid in Kew Bull. **1925,** 354 ; Summerh. in Hutch. & J. M. Dalz. Fl. W. Trop. Afr. **2,** 405 (1936) ; H. Perrier in Humbert, Fl. Madag. Orch. **1,** 8 (1939).

Habenaria sect. *Phyllostachya* Benth. in Benth. & Hook. f. Gen. Plant. **3,** 626 (1883) ; Hook. f., Fl. Brit. Ind. **6,** 132 (1891).

Platanthera sect. *Galeandriformes* Kraenzl. Orch. Gen. et. Sp. **1,** 610 (1899), pro maxima parte.

[*Platanthera*, non Rich. ; Rolfe in Dyer, Fl. Trop. Afr. **7,** 203 (1898), pro maxima parte, et in Dyer Fl. Cap. **5,** iii. 88 (1912)].

Phyllomphax Schltr. in Fedde, Repert. Spec. Nov. Beih. **4,** 118 (1919) ; Summerh. in Hutch. & J. M. Dalz. Fl. W. Trop. Afr. **2,** 407 (1936).

Gyaladenia Schltr. in Beih. Bot. Centralbl. **38,** ii. 124 (1921)

Diplacorchis Schltr. l.c. 127 (1921) ; Summerh. in Hutch. & J. M. Dalz. Fl. W. Trop. Afr. **2,** 405 (1936) ; H. Perrier in Humbert, Fl. Madag. Orch. **1,** 9 (1939).

Herbae terrestres vel rarissime epiphyticae ; tubera plura, elongata, ellipsoidea vel fere sphaeroidea ; caulis erectus, ± dense foliatus, simplex ; folia plura vel saepius numerosa, saepe dense imbricata, sursum sensim decrescentia, in bracteas abeuntia ; inflorescentia terminalis, pluri- vel saepius multiflora, racemosa rarissime uniramosa ; bracteae foliis similes, saepius flores aequantes vel superantes ; flores adscendentes vel arcuatim erecto-patentes vel rarius patentes, rosei, purpurei, violacei, flavi vel albidi, saepe purpureo- vel violaceo-notati, maculati vel punctati ; sepalum intermedium erectum, ± convexum, lateralia libera, patentia vel ± deflexa, quam intermedio saepius majora ; petala adscendentia vel erecta, libera vel saepius basi margine posteriore

cum columnae ± adnata, rarius cum sepalo intermedio adnata ; labellum porrectum vel deflexum, saepe tepalis longius, basi hypochilio cymbiformi saccato vel calcariformi instructum, epichilio integro bilobato vel trilobato plano vel lateribus reflexis, hypochilio lateribus saepe in epichilio ± decurrentibus ; columna pro rata alta, saepe satis gracilis, auriculis sub anthera orbicularibus, quadratis vel leviter bilobatis ; anthera saepius mutica, loculis parallelis, canalibus nullis ; pollinia pyriformia, sectilia, caudiculis brevibus, viscidiis orbicularibus vel ellipticis nudis ; rostelli lobus intermedius erectus, inter locules antheris situs, plicatus, apice ± cucullatus, lobi laterales breves, saepe carnosi, porrecti vel suberecti ; fovea stigmatica excavata.

Species 33 adhuc notae, Asiae tropicae, Africae tropicae et australi et Madagascariae indigenae.

Species typica.—*B. ovata* Lindl.

Artificial Key to Species

It should be noted that as size measurements are often used in this key, fully developed flowers should always be examined. It is well known that in many orchids the flowers still continue to grow in size after they have opened).

¶Leaves glabrous ; stems also usually glabrous but sometimes shortly pubescent :

*Hypochile of labellum produced into a distinct though sometimes short spur, 2 mm. or more in length, which may be broad and rounded or conical, or narrow and tapering :

†Spur of hypochile over 5·5 mm. long :

Hypochile spur usually slightly wider towards the obtuse apex, 5·5–10·5 mm. long ; sides of hypochile decurrent on to epichile as two tall keels terminating abruptly in front ; epichile with a narrow convex or gibbous apical portion, broadened below or at the base only ; petals ligulate, more or less S-shaped, attached to the column in the lower part ; leaves numerous, lanceolate, imbricate, up to 6 cm. long and 1·2 cm. broad . . . . . 18 *tenuior*

Hypochile spur always tapering towards the apex which is sometimes quite narrow ; labellum epichile usually broadest towards the front, usually markedly emarginate at the apex with a central apiculus or very shortly trilobed (rarely acute but then not at all convex or gibbous) :

Epichile acute at apex, lanceolate to ovate, 10–18 mm. long, 5·5–17 mm. broad ; upper leaves lanceolate, acute or acuminate, up to 11 cm. long and 2·5 cm. broad, lower leaves shorter and sometimes broader ; bracts similar to leaves, much longer than flowers ; tepals green or purplish, labellum yellowish-green with basal yellow spot . . 6 *acuta*

Epichile rounded, emarginate, truncate or shortly trilobed at the apex :

Apex of epichile truncate and/or shortly trilobed ; epichile 4·5–10 mm. long and about the same broad, margins often ± crenulate or toothed ; leaves numerous, imbricate, lanceolate, very acute or acuminate, up to 3–6·5 cm. long and 1–2·5 cm. broad ; hypochile spur broadly conical, ± incurved, 5·5–8 mm. long ; petals oblong, elliptical, ovate-oblong or ovate-elliptical, rounded at apex ; African plant . . . . 13 *conica*

Apex of epichile rounded or emarginate, sometimes with a small central apiculus, but scarcely truncate ; epichile 12–33 mm. long, variable in shape and relative breadth :

Bracts mostly distinctly shorter than the flowers so that the inflorescence is clearly defined ; petals ± curved or S-shaped, lanceolate-ligulate or lanceolate, quite free from the column ; epichile obcordate, with a marked cuneate base, 15–23 mm. long and about the same in breadth, apical sinus rather deep and narrow ; lower leaves lanceolate-elliptical, upper lanceolate or oblanceolate, up to 6·5–13 cm. long and 2·5–5 cm. broad ; hypochile spur 7–10 mm. long, conical, incurved, with a very narrow acute apex ; African plant . . . . . 4 *macrantha*

Bracts longer or sometimes shorter than the flowers, but inflorescence not clearly defined ; petals oblique but not curved or S-shaped ; apical sinus of epichile, where present, broad and shallow ; margins of leaves ciliolate ; Asiatic plants :

Leaves broadly elliptic-lanceolate to ovate, largest 2·5–7·5 cm. long and 1–3·5 cm. broad ; flowers usually longer than the bracts ; petals narrowly or ligulate-lanceolate, acute, about $3\frac{1}{2}$–$5\frac{1}{2}$ times as long as broad ; labellum epichile broadly obcordate, orbicular, or almost transversely elliptical, with no obvious narrowed basal part, 14–24 mm. long, 16–30 mm. broad; hypochile spur conical, often shortly bilobulate at the apex, 6·5–12·5 mm. long . 2 *henryi*

Leaves lanceolate to narrowly lanceolate, largest 5·5–14 cm. long, 1·5–3·5 cm. broad ; flowers much shorter than bracts : petals lanceolate or broadly lanceolate, 2–4 times as long as broad :

Labellum epichile orbicular, rounded at apex, 19–22 mm. long and broad ; petals about $2\frac{1}{2}$ times as long as broad ; leaves lanceolate, up to 7 cm. long and 2 cm. broad ; plants small, 10–20 cm. high ; spur slender, 8–10 mm. long . 3 *laotica*

Labellum epichile broadly or orbicular-ovate, often slightly emarginate at the apex, 12–33 mm. long and not quite so broad ; petals on the average about 3 times as long as broad ; leaves lanceolate to narrowly lanceolate, up to 14 cm. long and 3·5 mm. wide ; plants medium sized, 15–60 cm. high ; spur with a narrow apex, 6·5–10·5 mm. long . . . . . 1 *helferi*

††Spur of hypochile up to 5·5 mm. long, variable in shape :

§Asiatic species :

Petals adnate to intermediate sepal to form a hood over the column ; leaves equally spaced along stem ; South Indian species ; spur of hypochile 2·5–5 mm. long :

Labellum epichile 5·5–11 mm. long, obovate or orbicular-obovate, the central lobe or apiculus triangular, often projecting beyond the broad rounded lateral lobes ; lowest bracts usually longer than the flowers and the flowering part of the stem therefore not clearly defined from the vegetative part ; leaves rather closely set, sometimes much imbricate . . . . . 7 *iantha*

Labellum epichile 12–23 mm. long, broadly obcordate, with a very large sinus, the central apiculus very small or absent ; lowest bracts usually much shorter than the flowers, the flowering part of the stem consequently well defined ; leaves not usually closely imbricate, often well spaced-out . . . . . 8 *splendida*

Petals free from intermediate sepal, and therefore no hood over the column :

Leaves narrowly lanceolate to linear-lanceolate, up to 9 cm. long and 2 cm. wide, evenly spaced along stem ; labellum epichile narrowly obovate, truncate or slightly retuse at the apex, 14–16·5 mm. long, 10–14 mm. broad ; hypochile spur about 5 mm. long, narrow, only about 2 mm. broad at the mouth, tapering to the apex and somewhat incurved ; lowest bracts usually more than twice as long as the flowers . . . . . 5 *obovalis*

Leaves lanceolate to broadly lanceolate, not exceeding 8 cm. in length and usually less than 5 cm. ; labellum epichile obcordate, orbicular-obcordate or almost orbicular, nearly as broad as long or broader ; lowest bracts exceeding flowers in length but rarely twice as long :

Upper leaves abruptly much larger than lower ones, lanceolate, broadly lanceolate or almost elliptical ; bracts much smaller than leaves, inflorescence therefore rather well defined ; spur rather slender, not much

narrowed towards apex ; labellum epichile broadly obcordate, not exceeding 8·5 mm. in length, usually broader than long ; sides of hypochile and base of epichile densely pubescent ; plants small, not exceeding 25 cm. in height . . . . . 11 *obcordata*

Upper leaves not abruptly larger than lower, lanceolate to ovate ; lower bracts similar to leaves, the inflorescence therefore not clearly defined ; spur slender or more frequently broadly conical, markedly narrowed towards apex ; labellum epichile 7–20 mm. long ; plants 15–50 cm. in height :

Intermediate sepal 12–14 mm. long ; labellum epichile almost orbicular with a marked central apiculus, 12–20 cm. long and about the same in breadth ; leaves broadly lanceolate or ovate-lanceolate, up to 5 cm. long and 2·75 cm. broad ; South Indian species . . . . . 10 *wightii*

Intermediate sepal 6·5–9 mm. long ; labellum epichile obcordate or broadly obcordate, apex emarginate with central apiculus absent or very small ; leaves lanceolate or elliptical-lanceolate :

Labellum epichile flabellate-obovate, about 7 mm. long ; sides of hypochile glabrous ; spur not much tapering from a relatively narrow mouth ; lower part of column (from junction with hypochile sides to apices of auricles) 0·8 mm. long ; leaves narrowly lanceolate, acute or acuminate, up to 9 cm. long and 3 cm. broad ; petals free from column . 12 *thorelii*

Labellum epichile broadly obovate or orbicular-obovate, emarginate at apex, 7·5–16·5 mm. long ; sides of hypochile shortly pubescent ; spur tapering from a rather wide mouth ; lower part of column 1·5–2·5 mm. long ; leaves broadly lanceolate to oblong- or elliptical-lanceolate, acute or obtuse, up to 5 cm. long and 2·5 cm. broad ; petals united at base to column . . 9 *galeandra*

§§ African or Madagascan species :

Hypochile spur distinctly and acutely bifid at the apex (not merely emarginate, rounded), 4·5–5 mm. long ; leaves numerous (over 13), lanceolate, very acute, more or less incurved in the upper part, up to 4 cm. long and 2 cm. broad, but usually narrower ; flowers numerous, in a dense spike 1·5–2 cm. in diameter ; intermediate sepla 6·5–9·5 mm. long ; labellum epichile elliptical to ovate, almost entire or indistinctly trilobed about the middle ; Madagascan species . . . . . 14 *disoides*

Hypochile spur entire, or slightly emarginate and rounded, at the apex, broad or narrow :

Intermediate sepal 3–4 mm. long ; labellum epichile up to 3 mm. long :

Plant tall (30–45 cm.) and slender with lanceolate leaves up to 5·5 cm. long more or less evenly spaced out and only slightly overlapping ; flowers as long as or longer than the bracts, in a dense spike 1–1·5 cm. in diameter ; spur about 3 mm. long, conical from a wide mouth, incurved, obtuse and emarginate at the apex ; labellum epichile ovate, indistinctly trilobed 15 *rhodostachys*

Plant short (10–20 cm.) with closely imbricate narrowly lanceolate leaves up to 5 cm. long ; flowers shorter than the bracts, especially the lower ones, in a dense spike about 2–2·5 cm. in diameter ; spur 1·75–2·5 mm. long, cylindrical with a narrow mouth ; labellum epichile distinctly trilobed in the middle, lateral lobes relatively large, subacute . . . 17 *macowaniana*

Intermediate sepal 4–5 mm. long or more ; labellum epichile at least 3·5 mm. long and usually considerably longer :

Spur of hypochile slender with a narrow mouth, slightly tapering, incurved, 3–4·5 mm. long ; labellum epichile with a large orbicular or quadrate middle lobe and much smaller narrow basal lateral lobes which are, however, sometimes poorly developed ; plant slender, 8–25 cm. high, with 4–14 linear-lanceolate or lanceolate usually only slightly overlapping leaves ; inflorescence usually not very dense, up to 25-flowered 16 *friesii*

Spur of hypochile with a broad mouth, broad and rounded or conical, tapering, variable in length ; labellum epichile ± lobed at the middle or above :

Middle lobe of epichile triangular, shorter than or equalling in length, and usually smaller than the lateral lobes ; epichile ± orbicular, obovate or oblong, lobed at the very apex ; hypochile spur 4–5·5 mm. long ; intermediate sepal 7·5–13·5 mm. long ; inflorescence (excluding the bracts) 2–4·5 cm. in diameter :

Spur of hypochile very broad and rounded ; plant tall (40–100 cm. in height) ; leaves numerous, closely imbricate, lanceolate, acuminate, up to 11 cm. long and 3 cm. broad ; lateral lobes of epichile ± connivent so that apex is rounded in general shape and not at all truncate ; bracts always longer than flowers ; inflorescence up to 25 cm. long ; petals lanceolate or broadly lanceolate, ± acute at apex . . 19 *sceptrum*

Spur of hypochile conical with a relatively narrow apex, ± incurved ; plant medium size (20–40 cm. in height) ; leaves numerous, lanceolate, closely imbricate, up to 6·5 cm. long and 2·5 cm. broad ; apex of epichile ± truncate with non-connivent lateral lobes ; bracts longer or shorter than flowers ; inflorescence up to 16 cm. long ; petals oblong, elliptical, ovate-oblong or ovate-elliptical, rounded at apex . . . . . 13 *conica*

Middle lobe of epichile rounded, oblong or broadly triangular, longer than the laterals ; hypochile spur 1–3·5 mm. long :

Petals narrowly oblong or ligulate, truncate or retuse at the apex ; stem leafy (leaves usually much exceeding 10 in number) with imbricate leaves ; intermediate sepal 5–7·5 mm. long ; flowers numerous in a rather dense spike, 10–25 cm. in length ; labellum epichile narrowly obovate or rhombic, 5–9 mm. long, distinctly trilobed above the middle, middle lobe ± truncate or retuse 20 *congoensis*

Petals narrowly elliptical to ovate, rounded at the apex ; leaves 5–10 ; inflorescence up to 13 cm. long, but usually 10 cm. or less :

Lower leaves on flowering stem usually much larger than upper ones, up to 16 cm. long by 4 cm. broad ; flowers up to 20 ; intermediate sepal 11–14·5 mm. long ; petals broadly ovate, with reticulate venation ; labellum epichile quadrate or oblong, 9–15 mm. long, distinctly trilobed in the upper part, the middle lobe broadly triangular, obtuse, rounded or retuse ; hypochile spur very broad and rounded, 1–3 mm. long . . . . . 23 *paucifolia*

Lower leaves on flowering stem not much larger than upper leaves ; leaves on separate sterile shoots, oblanceolate, acute, stalked, up to 20 cm. long, 2–3·5 cm. broad ; flowers usually exceeding 20 ; intermediate sepal 6–11·5 mm. long ; petals elliptical or ovate-elliptical, outer veins branched but venation not markedly reticulate ; labellum epichile orbicular or broader than long, lobes indistinct or rounded, middle one sometimes triangular and ± truncate ; flowers white or purplish, labellum darker with purple spots :

Inflorescence 5–6 cm. in diameter ; labellum epichile 10–12 mm. long and 12–13 mm. broad . . . . . 22 *oligophylla*

Inflorescence 1·5–3 cm. in diameter ; labellum epichile 5–9 mm. long and 5·5–9 mm. broad . . . . . 21 *angolensis*

**Hypochile of labellum very shortly saccate or cymbiform but not forming a spur or spur-like projection :

Leaves mostly forming a tuft at the base of the stem, cauline leaves few, smaller ; radical leaves narrow or oblong-lanceolate, 19–48 cm. long, 2–3·5 cm. wide ; intermediate sepal 11–12 mm. long ; labellum about 2 cm. long altogether ; epichile suborbicular, apiculate, the sides reflexed, 14 mm. long and nearly as wide ; flowers bright purple . . . 29 *basifoliata*

Leaves distributed more or less evenly along whole length of stem, those at the base either reduced to scales or smaller than those farther up :

Labellum epichile with a conical callus at base just in front of hypochile, reniform, trilobed with middle lobe shorter and smaller than lateral lobes ; flowers small (intermediate sepal 4–5 mm. long and laterals a little longer) in a dense spike 1–2 cm. in diameter ; sides of hypochile broadly angled in centre ; flowers pink, mauve or purple, labellum often darker . . . . . 25 *buchananii*

Labellum epichile without a conical basal callus but usually with a longitudinal ridge terminating in the middle lobe :

Leaves few (4–7) ± erect, the lowest ones the largest ; flowers small (intermediate sepal 4·5–5·5 mm. long) in a rather dense terminal spike about 2 cm. in diameter; bracts much smaller than the leaves ; labellum epichile flat, broadly cuneate, trilobed at the apex only, the middle lobe very small, triangular . . . . . 24 *inhambanensis*

Leaves numerous closely imbricate or, if fewer, with the middle ones the largest ; flowers usually considerably larger (intermediate sepal 5–14 mm. long) ; labellum epichile with the sides usually ± reflexed ; bracts similar to the upper leaves, the lowest usually much longer than the flowers :

Leaves lanceolate or linear-lanceolate, terminating in a very long fine point ; labellum hypochile small, 1·5–2·5 mm. long from back to front, sides triangular, subacute ; petals lying forward from the column, semi-orbicular, broadly obovate or orbicular-obovate, with marked reticulate venation ; stem and leaves becoming black on drying ; flowers purple, mauve or violet, often with darker markings . . . . . 26 *pleistophylla*

Leaves lanceolate or broadly lanceolate, acuminate but not very finely pointed ; labellum hypochile moderate to

large, 3·5–6 mm. long from back to front, sides sloping down from column, scarcely or very slightly angled ; petals obliquely ovateor elliptical-ovate ; stem and leaves not becoming black on drying :

Flowers in relatively loose spikes, up to 22 in number, thin in texture ; leaves few (less than 15), not closely imbricate, up to 10 cm. long and 2 cm. broad, rather thin in texture ; petals broadly ovate, set forward from the column or spreading ; labellum 1·5–2·5 cm. long, lateral lobes always longer than middle lobe ; usually epiphytic or on rocks, up to 40 cm. high ; flowers pale purple or violet . . . . . 28 *kalbreyeri*

Flowers in a dense or rather dense spike, numerous, usually 20–100 in number, rather fleshy in texture ; leaves numerous, closely imbricate, up to 8 cm. long and 2·5 cm. broad, rather stiff and rigid ; petals obliquely ovate or elliptical-ovate, closely placed on each side of column ; labellum 8–16 mm. long, middle lobe exceeding, equalling or shorter than the laterals ; terrestrial plant up to 1 m. high ; flowers pink, purple or mauve with darker markings . . . 27 *ovata*

¶¶Leaves more or less covered with a short velvety indumentum, very numerous, closely imbricate, lanceolate, acute or acuminate :

Hypochile of labellum forming a distinct rounded spur about 2 2·5 mm. long ; epichile flat, broadly obovate, ± equally trilobed at the apex, 4·5–5 mm. long and not quite as broad ; flowers yellowish-white or cream-coloured . . . . . 30 *pilosa*

Hypochile of labellum saccate, but not forming a distinct spur :

Epichile of labellum flat or concave, the sides not at all reflexed :

Labellum with a knee-like bend at the junction of epichile and hypochile so that the former hangs more or less vertically downwards ; epichile usually broader than long, the middle lobe shorter than or equalling in length the lateral lobes, triangular, ± acute ; intermediate sepal 4·5–7·5 mm. long ; flowers pink, mauve or purple with orange or yellow throat 31 *pubescens*

Labellum without any knee-like bend, the epichile therefore projecting forwards or even upwards ; epichile usually longer than broad, the middle lobe longer than the lateral lobes, ± truncate or rounded ; intermediate sepal about 5 mm. long ; tepals cream with brownish or maroon markings, labellum yellow . . . . . 32 *velutina*

Epichile of labellum with the sides ± reflexed, lateral lobes longer than the middle lobe ; intermediate sepal 7 mm. long ; flowers yellow, labellum with brown lines . . . . . 33 *mixta*

Enumeration of Species

In the synonymy and citation of literature only the original places of publication and references to standard Floras or Revisions are included. No attempt has been made to account for every reference to each species in the literature.

In the citation of specimens the following abbreviations are used to indicate the various Herbaria : B = Botanisches Museum, Berlin-Dahlem ; BR = Jardin Botanique de l'Etat, Brussels ; BM = British Museum, Natural History, London ; COI = Institut Botanique, Coimbra, Portugal ; K = Royal Botanic Gardens, Kew ; P = Museum National d'Histoire naturelle, Paris ; PRE = National Herbarium, Pretoria ; S = Naturhistoriska Riksmuseet, Stockholm ; W = Naturhistorisches Museum, Vienna. When no letter is mentioned the specimen is in the Kew Herbarium.

1. **Brachycorythis helferi** (*Rchb. f.*) *Summerhayes*, comb. nov.

Gymnadenia helferi Rchb. f. in Flora, **55,** 276 (1872).

Habenaria helferi (Rchb. f.) Hook. f. Fl. Brit. Ind. **6,** 164 (1891).

Platanthera helferi (Rchb. f.) Kraenzl. Orch. Gen. et Sp. **1,** 611 (1899).

Phyllomphax helferi (Rchb. f.) Schltr. in Fedde, Repert. Spec. Nov. Beih. **4,** 119 (1919), in obs.

India. Assam, Khasia Hills, *Simons* ; Cachar Hills, Haflong, 800 m. alt., Aug. 1908, *Craib* 205 ; South Lushai Hills, 900 m. alt., on shady moist banks, Aug. 1931, *Wenger* 313.

Burma. Katha Distr., near Mohnyin Reserve, 300 m. alt., July 1911, *Lace* 5350 ; Moulmein, *Lobb* ; Mergui, 1874, *Parish* 36 ; Terasserim, 1837, *Helfer* 244 (W, type, not seen ; K, BM).

Siam. Chiengmai, Muang Ha, 1600 m. alt., Oct. 1922, *Kerr* 499 ; Tung Fueng, July 1915, *Kerr* s.n. ; Me Chem, 500 m. alt., July 1922, *Kerr* s.n. ; Tak, Muan, Me Mue, 300 m. alt., June 1922, *Kerr* 478; Kampea Pet, Kao Hua Mot, 1600 m. alt., in deciduous mixed forest, June 1922, *Kerr* s.n. ; Surat, Ban Nasan, 10 m. alt., Aug. 1927, *Kerr*, s.n. ; Ban Kawp Kep, 10 m. alt., Aug. 1927, *Kerr* 0430 ; same locality, in bamboo forest, Aug. 1927, *Kerr* 0430A.

2. **Brachycorythis henryi** (*Schltr.*) *Summerhayes*, comb. nov.

[*Platanthera iantha* non Wight ; Rolfe in Journ. Linn. Soc. Lond. Bot. **36,** 55 (1903)].

Phyllomphax henryi Schltr. in Fedde, Repert. Spec. Nov. Beih. **4,** 45, 119 (1919).

Platanthera Dielsiana Soó in Ann. Mus. Nat. Hungar. **26,** 357 (1929).

China. Yunnan, Shweli-Salween divide, lat. 25° 30′ N., 3300 m. alt., in open grassland on margins of scrub, Aug. 1917, *Forrest* 15880 ; hills west of Tengyueh, 1800 m. alt., in moist pastures, June 1912, *Forrest* 8180 ; around Tengyueh, 1800 m. alt., in open clayey meadows and slopes, June 1924, *Forrest* 24583 (K, BM) ; Szemes, east mountains, 1350 m. alt., *Henry* 12418 ; same locality, on grassy hills, *Henry* 12418A ; Mengtse, 1500 m. alt., on grassy mountains, *Henry* 11111 (type, B, now destroyed ; K) ; Mengtse 1710 m. alt., on hill slopes, June 1893, *Hancock* 41 ; Kweichow, Lofou, S. of Kweijang, Aug. 1909, *Cavalerie* 3414.

Burma. N. Shan States, Lashio, 780 m. alt., June 1912, *Lace* 5837 ; Tonglong Reserve, 450 m. alt., June 1909, *Lace* 4827 ; Laihka State, 1350 m. alt., on open down in red soil, July 1911, *Robertson* 368 ; Wetwin, N.E. of Maymyo, June 1927, *Clark* ; Maymyo plateau, 1050 m. alt. June 1911, *Lace* 5304.

Siam. Chiengrai, plain 1 km. to south-west, 375 m. alt., in open scrub and grass, Aug. 1926, *Garrett* 303 ; Muan, Pagao, July 1931, *Put* 3967 ; Chiengmai, Doi Sutep, 300–720 m. alt., common in deciduous jungle, July 1909, *Kerr* 112 ; same locality, near base of mountain, 400 m. alt., Aug. 1951, *Garrett* 1354 ; same locality and altitude, July 1914, *Kerr* (112) ; same locality, 700 m. alt., Aug. 1921, *Kerr*, s.n. ; Chiengmai, Me Fun, 1100 m. alt., July 1922, *Kerr*, s.n. ; Udon, Nong Ham, on shaded sandy soil, July 1932, *Lakshnakara* 1037.

I had for some time considered the possibility of this being a more northern and upland sub-species of *B. helferi* (Rchb. f.) Summerh. but on the examination of the rather extensive material available have come to the conclusion that it is better treated as a distinct though clearly allied species. It is an interesting point that although the leaves and the epichile of the labellum are relatively broader than in *B. helferi*, the petals are narrower. Some of the gatherings of *B. henryi* from the more southern parts of its range have leaves which approach those of *B. helferi* in size and shape, but there is usually no difficulty in distinguishing the species at sight.

3. **Brachycorythis laotica** (*Gagnep.*) *Summerhayes*, comb. nov.

Habenaria laotica Gagnep. in Bull. Soc. Bot. France, **78,** 71 (1931) ; et in Lecomte, Fl. Gén. Indo-Chine, **6,** 598, t. 59, fig. 1–6 (1934).

Laos. Bassac, Stung-streng, 1866–1868, *Thorel* 2145 (type, P).

Annam. Pongour, near Djiring, *Evrard* (P, not seen).

This species combines the labellum characters of *B. henryi* (Schltr.) Summerh. with leaves which are more like those of *B. helferi* (Rchb. f.) Summerh. but which are also reminiscent of those of *B. obcordata* (Lindl.) Summerh. We still, however, know so little about the plants of this affinity occurring in French Indo-China that it is not possible to classify them with any degree of certainty.

4. **Brachycorythis macrantha** (*Lindl.*) *Summerhayes*, comb. nov.

Gymnadenia macrantha Lindl. Gen. & Sp. Orch. Pl. 279 (1835).

Eulophia helleborina Hook. f. in Curtis, Bot. Mag. **96,** t. 5875 (1870).

Habenaria helleborina (Hook. f.) Nichols. Dict. Gard. **2,** 107 (1885).

Gymnadenia macrantha Lindl., var. *punctulata* Rchb. f. Xenia Orch. **3,** 71, t. 237, fig. II 3–7 (1890).

Platanthera helleborina (Hook. f.) Rolfe in Dyer, Fl. Trop. Afr. **7,** 204 (1898).

P. macrantha (Lindl.) Kraenzl. Orch. Gen. et Sp. **1,** 612 (1899) ; 939 (1901).

Phyllomphax helleborina (Hook. f.) Schltr. in Fedde, Repert. Spec. Nov. Beih. **4,** 119 (1919), in obs. ; Summerh. in Hutch. & J. M. Dalz. Fl. W. Trop. Afr. **2,** 407 (1936).

P. macrantha (Lindl.) Summerh. in Kew Bull. **1938,** 143.

French Guinea. Koumi River, Aug. 1907, *Pobéguin* 1671 (P) ; Kouyeya, in damp undergrowth, July 1898, *Maclaud* 274 (P) ; Boiral de Mamou, Oct. 1898, *Maclaud* 226 (P) ; Futa Jalon, Ditinn, Sept. 1907, *Chevalier* 18529 (P) ; Nimba Mts., in forests on slopes, Sept. 1942, *Schnell* 1857.

Sierra Leone. No locality, *Miss Turner* (type, K) ; Foya (Kori), edge of bush path, Aug. 1953, *Deighton* 5945 ; Baiima (Gbo), in forest, Aug. 1954, *Deighton* 6105 ; Sugarloaf Mt., in shady places, Dec. 1891, *Scott Elliot* 4061 ; above Freetown, on hillside, Sept.

1941, *Milne-Redhead* 5147 ; Freetown, Jamadu, York Pass, *Burbidge* 147 ; Kanike, 240 m. alt., Sept. 1914, *Thomas* 2046 ; Jigaya, 330 m. alt., Sept. 1914, *Thomas* 2738 ; Bagwema, Bafi River, July–Aug. 1923, *Dawe* 547 ; Regent Road, 270 m. alt., Aug. 1937, *Pelly* 156 ; Mahinti (Tonko Limba), beside bush path in shade on gravelly soil, Sept. 1949, *Adames* 195 ; Baiima (Tankoro) in flat waterlogged land by river, July 1949, *Deighton* 5118 ; junction of Port Loko and Kambia roads, under Mango trees, Sept. 1951, *Adames* 244 ; Pujehun (Valunia), in forest, July 1952, *Deighton* 5795 ; Banana Islands, top of Prospect Hill, Oct. 1914, *Bunting* 87 (BM).

Liberia. Central Prov., near Sanokwele, Sept. 1947, *Baldwin* 9536.

Nigeria. Zaria Prov., Anara Forest Reserve, Rafin Makara, at margin of fringing forest, in shade, July 1950, *Keay* FHI 25960 ; Ondo Prov., Idanre Hills, in forest, in shade, July 1950, *Lady Hoskyn-Abrahall* FHI 36068 ; Calabar Prov., Oban, 1911, *Talbot* 869 (BM).

British Cameroons. Bamenda, Fonfaka, 900 m. alt., on moss covered boulders in forest, June 1931, *Maitland* 1639.

French Cameroons. Between Ngaou Ndéré and Meiganga, in shady undergrowth, June 1939, *Jacques Félix* 4215 (K, P) ; Buar, 300 m. alt., May 1914, *Mildbraed* 9472 (K, BM) ; Buar, Bosum, July 1914, *Tessmann* 2664.

Oubangui-Chari. Timbo, *Pobéguin* 1671 (P) ; Yalinga, in gallery forest, July 1922, *Le Testu* 4008 (P).

Gabon. Upper Ngounyé River, Dondo (Icobe), March 1926, *Le Testu* 5880 ; island in Louetayé River, near Makoubi, among mosses, April 1927, *Le Testu* 6471 (Herb. Le Testu) ; Upper Ogoué River, Lécala, April 1931, *Le Testu* 8777.

B. macrantha, though very similar superficially to several of the Indian and Indo-Chinese species of the genus, notably *B. helferi* (Rchb. f.) Summerh., differs in the very distinct inflorescence, due to the relatively small bracts, and the very poor development of the marginal papillae or cilia on the leaves. These are very short and scarcely visible in the African species whereas in *B. helferi* and its allies (viz. *B. henryi* (Schltr.) Summerh., *B. acuta* (Rchb. f.) Summerh. and *B. obovalis* Summerh.) the long ciliolate or papillose margins are a striking feature of the leaves.

5. **Brachycorythis obovalis** *Summerhayes, sp. nov.*

Herba terrestris, erecta, 12–30 cm. alta. *Tubera* globosa vel ellipsoidea, 1–2 cm. longa, 0·5–1 cm. diametro, sparse lanuginosa. *Caulis* foliosus, rectus vel leviter flexuosus, teres, 2–3 mm. diametro, breviter pubescens vel glabrescens. *Folia* 5–7, ± patentia vel erecto-patentia, infima in vaginis redacta, superiora lanceolata vel anguste lanceolata, acuta vel acuminata, usque ad 9 cm. longa et 2 cm. lata, marginibus ciliatis, basi breviter vaginantia, vaginis breviter pubescentibus. *Inflorescentia* usque ad 11-flora, sublaxa, 4–16 cm. longa ; rhachis interdum leviter fractiflexa, teres, 1–2 mm. diametro, breviter glanduloso-pubescens ; bracteae foliaceae, infimae foliis superioribus similes et vix minores, flores multo excedentes, sursum decrescentes, superiores lanceolatae, circiter 2–4 cm. longae et 6–10 mm. latae, omnes bracteae glabrae (vaginis exceptis) marginibus ciliolatis. *Flores* patentes, de colore nil constat, inferiores bracteis multo breviores, superiores interdum bracteas aequantes vel superantes, fere glabri ; pedicellus cum ovario arcuatus, circiter 1 cm. longus, dense papilloso-puberulus vel glabrescens. *Sepalum* intermedium ± erectum, oblongo-lanceolatum, apiculatum, 8·5–12 mm. longum, 2–5 mm. latum, ± concavum ; sepala lateralia patentia vel ± deflexa, oblique curvatim lanceolata vel ligulato-lanceolata, apice obtusa, 8·5–14 mm. longa, 2–5·5 mm. lata ; omnia sepala trinervia. *Petala* erecta, cum sepalo intermedio galeam formantia, basi cum columna brevissime adnata, oblique et leviter curvatim anguste lanceolata, apice subacuta,

7–11 mm. longa, 1·75–3·75 mm. lata, binervia. *Labellum* porrectum, 15–17·5 mm. longum ; epichilium obovatum vel anguste obovatum, apice ± truncatum vel emarginatum, 14–16·5 mm. longum, 10·5–14 mm. latum, ante ostium calcaris brevissime puberulum, multinervium ; hypochilium in calcar anguste conicum leviter incurvatum apice angustatum 4·75–5·25 mm. longum productum, in toto 6·25–7·25 mm. longum, ore circiter 2 mm. diametro. *Columna* erecta, circiter 4 mm. longa, auriculis parvis semi-orbicularibus ; anthera mutica, canalibus nullis ; rostelli lobus intermedius triangulus, plicatus.

Burma. Upper Chindwin Distr., Paungbyin Reserve, 180 m. alt., Aug. 1908, *Lace* 4222 (type, K) ; Maymyo Plateau, 1050 m. alt., June 1911, *Lace* 5273.

Siam. Kanburi Distr., Hin Dat, July 1926, *Put* 75.

This species somewhat resembles *B. helferi* (Rchb. f.) Summerh. but differs in the shorter hypochile spur, and the narrower labellum epichile which is obovate in shape, rather than ovate as is generally the case in *B. helferi*. It is possible that further investigation may show that this species, *B. acuta* (Rchb. f.) Summerh. and *B. helferi* are best treated as variants of one species but at present our knowledge is insufficient to justify such a treatment.

6. **Brachycorythis acuta** (*Rchb. f.*) *Summerhayes*, comb. nov.

Gymnadenia acuta Rchb. f. Otia Bot. Hamburg. 32 (1878).

Platanthera acuta (Rchb. f.) Kraenzl., Orch. Gen. et Sp. **1,** 611 (1899).

Phyllomphax acuta (Rchb. f.) Schltr. in Fedde, Repert. Spec. Nov. Beih. **4,** 119 (1919), in obs.

Habenaria acuta (Rchb. f.) Gagnep. in Lecomte, Fl. Gén. Indo-Chine, **6,** 597 (1934).

India. Assam, S. Lushai Hills, 750 m. alt., on ground in shaded forests, Sept. 1928, *Wenger* 245.

Siam. Doi Chiengdao, Hua Doi-Nang, 940 m. alt., June 1952, *Garrett* 1392 ; Chiengmai, Me Chem, 700 m. alt., in mixed deciduous forest, July 1922, *Kerr* 487 ; Kanburi, Sai Yok, Aug. 1928, *Put* 1915 ; same locality, 70 m. alt., in forest, Aug. 1928, *Masran* 2406.

Cambodia. Pursat Prov., Prum Bat, Slap tien Koom, June 1875, *Godefroy-Leboeuf* (type, K, P) ; between Punchré and Stungchré, *Poilane* (P, not seen) ; Kompong-spen Prov., between Punlovea and Pun-rung, *Poilane* (P, not seen).

The shape of the labellum epichile shows considerable variation in breadth from the lanceolate very acute epichile of the type specimen and other similar gatherings to a very broad ovate epichile with shortly acuminate apex as in *Garrett* 1392. *B. obovalis* Summerh. is similar in general features but in that species the apex of the epichile is truncate or emarginate though it shows much the same variation in relative width as in *B. acuta*.

7. **Brachycorythis iantha** (*Wight*) *Summerhayes*, comb. nov.

Platanthera iantha Wight, Ic. Pl. Ind. Or. **5,** part 1, p. 11, t. 1692 (1851).

P. affinis Wight, l.c. p. 12, t. 1693 (1851).

Gymnadenia iantha (Wight) Rchb. f. Otia Bot. Hamburg. 33 (1878).

Habenaria galeandra, var. *nilagirica* Hook. f. Fl. Brit. Ind. **6,** 164 (1891).

H. iantha (Wight) Hook. f. l.c., quoad syn. tantum, excl. descr.

H. obcordata, var. *galeandra* Fyson, Fl. Nilgiri & Pulney Hill-tops, **1,** 405 (1915).

H. obcordata, var. *nilagirica* (Hook. f.) Fyson, l.c.

Phyllomphax iantha (Wight) Schltr. in Fedde, Repert. Spec. Nov. Beih. **4,** 119 (1919), in obs.

India. Chota Nagpur, July, *Wood* (not seen) ; Nilgiri Hills, *Wight* (type, K ; BM) ; Ootacamund, 2100 m. alt., July 1883, *Lawn in Herb. Gamble* 12871 ; Naduvatam, path by stream, Aug. 1913, *Bourne* 6149 ; Pulney Hills, Kodaikanal, 2250 m. alt., Aug., *Anglade* 2125 ; 2160 m. alt., Sept. 1913, *Saulière* 109 ; 2100 m. alt., July, *Anglade* 972 ; same locality, Bruce's Valley, June 1901, *Bourne* 1997 ; ridge behind Sidcot, June 1898, *Bourne* 1188 ; Bear Shola Hill, June 1897, *Bourne* 442 ; Perumal-malai, May 1897, *Bourne* 155 ; Anamalai Hills, July 1851, *Wight*, Kew Distrib. 3002 ; same locality, 2250–2400 m. alt., in grasslands, April 1915, *Fischer* 3800, same locality, 900 m. alt., *Beddome* 8071 (BM) ; Travancore, Nov. 1907, *Johnson* 109 ; Courtallam, *Wight* 912 (K, BM) ; same locality, July 1818, *Heyne* ; Aug. 1818, *Heyne in Herb. Rottler.*

The application of the epithet " iantha " first proposed by Wight seems to have caused a considerable amount of difficulty due to contradictory information in Wight's original publication. Wight figures two plants under his tabulae 1692 and 1693, which he terms *Platanthera iantha* and *P. affinis* respectively. These appear, judging from the size of the other parts, to have flowers of much the same size, with the second perhaps a little smaller than the first. *P. iantha* is said to come from the Nilgiri Hills (and also from Malabar), while *P. affinis* comes from the Pulney Hills, all these areas being in southern India.

In the text under *P. affinis*, however, Wight states that this species has much smaller flowers than *P. iantha*, and that in the latter species the inflorescence is more clearly defined, the bracts being considerably smaller than the ordinary leaves.

Among the material collected by Wight, which I have seen, are specimens which in my opinion represent three distinct species, one with small flowers and the other two with large flowers. In view of Wight's remarks under *P. affinis*, mentioned above, J. D. Hooker interpreted *P. iantha* as comprising the large-flowered plants collected by Wight and he rejected the figure (t. 1692) as not applying to this species. It should be pointed out that he made no distinction between the two large-flowered plants, though the differences can be seen in Wight's specimens. These differences are supported by the specimens obtained by later collectors.

The small-flowered plants collected by Wight come firstly from the Nilgiri Hills (plants closely resembling that figured in t. 1692), and, secondly, from Courtallam in Travancore ; these latter are a reasonable match of *P. affinis*, figured in t. 1693. These all have the petals so intimately adnate with the intermediate sepal that it is difficult to separate them. The adnation of these parts is specifically mentioned in Wight's description of *P. iantha.*

One of the large-flowered plants collected by Wight comes from the Pulney Hills. It also has the petals adnate to the intermediate sepals, while owing to the relatively small bracts the inflorescence is more distinct than in the other plants of this group. This feature is even more pronounced in specimens collected by Bourne and Anglade from the same area. It appears that this, therefore, may have been the plant which Wight refers to as *P. iantha* in his remarks under *P. affinis*. It does

not come from the Nilgiri Hills, however, nor does it at all agree with t. 1692.

The second of Wight's large-flowered species was collected in Travancore. It differs from the other two plants already mentioned by having the petals quite free from the intermediate sepal, all three being rather long and narrow. In this plant the inflorescence is more distinct than in the small-flowered plant but not so much as in the other large-flowered plant. It should be noted that in neither of the large-flowered plants is the expression in Wight's description of *P. iantha* "lip . . . . limb equalling the claw" applicable to the labellum, whereas in the small-flowered plant the labellum sometimes approaches this condition, though admittedly not to the degree shown in Wight's figure.

It therefore seems clear that the epithet "*iantha*" cannot be applied to the Travancore large-flowered species since it does not agree with the description in important features and does not at all resemble Wight's figure of *P. iantha*.

As between the other two species I feel that more weight should be given to the information in Wight's original description of *P. iantha* and to his plate than to remarks made under the description of another species (*P. affinis*). We know that Wight was working on his southern Indian plants for a considerable period and it is quite possible that the two descriptions and plates were prepared at different times, though there is no specific evidence to prove this. It seems likely that Wight included the large-flowered specimens in his concept of *P. iantha* after he had prepared his description and plate and that his comments under *P. affinis* were made on the mistaken assumption that all his *P. iantha* specimens were conspecific.

I am therefore applying the epithet *iantha* to the only species which agrees with *both* the original description and the figure (t. 1692). It is also surely significant that it is the only species of the three which has been so far recorded from the Nilgiri Hills, which is the type locality of *P. iantha*. So far as I can see Wight's *P. affinis* is merely a form of this species and I am therefore reducing it to *P. iantha*. The two large-flowered species are described elsewhere in this account as *Brachycorythis splendida* and *B. wightii*.

Judging by the description given by Haines (Bot. Bihar & Orissa, 1158 : 1924) this species also occurs in Chota Nagpur, if the record mentioned is correctly localised. The plant concerned is recorded under the name of *Habenaria galeandra* but the description agrees very well with *B. iantha*. It seems rather strange, however, that no one else has found this species at Chota Nagpur since there is no evidence that Wood, who collected the plant, visited any but easily accessible places.

8. **Brachycorythis splendida** *Summerhayes*, sp. nov.

Habenaria iantha Hook. f. Fl. Brit. Ind. **6,** 164 (1891), descr. tantum, partim, excl. syn.

Herba terrestris, erecta, 12–35 cm. alta. *Tubera* globosa, ellipsoidea vel late fusiformia, 1–3 cm. longa, circiter 1 cm. diametro, ± lanuginosa. *Caulis* rectus vel leviter flexuosus, foliosus, inferne 2–4 mm. diametro,

teres vel ± angulatus, glaber vel papillato-puberulus. *Folia* 7–17, suberecta vel erecto-patentia, crebre vel laxiuscule imbricata, infima ad vaginas redacta, superiora lanceolato, lanceolato-ovata, vel elliptico-lanceolata, acuta vel brevissime acuminata, usque ad 2–6 cm. longa et 1–2·2 cm. lata, basi breviter vaginantia, glabra, marginibus eciliatis. *Inflorescentia* 3–16-flora, 3–10 cm. longa, floribus inclusis 3–6 cm. diametro; rhachis teres vel ± angulata, 1–2 mm. diametro, saepius glabra ; bracteae saepius floribus multo breviores, lanceolatae, acutae, usque ad 3 cm. longae et 1·5 cm. latae. *Flores* patentes, purpurei, pro genere speciosi ; pedicellus cum ovario arcuatus, 1–2 cm. longus, glaber vel papillosus. *Sepalum* intermedium erectum, lanceolatum vel late lanceolatum, acutum, 7·5–9·5 mm. longum, 2·75–3·5 mm. latum, cum petalis adnatum galeam acutam columnam amplectens formans ; sepala lateralia galea adpressa sed libera, curvatim oblique lanceolata, acuta, 9—11 mm. longa, 2·5–4 mm. lata, omnia sepala trinervia vel quinquenervia. *Petala* cum sepalo intermedio adnata, lanceolata vel lineari-lanceolata, 8–9 mm. longa, 1·3–2·3 mm. lata, 2–3-nervia. *Labellum* in toto 15–25 mm. longum ; epichilium late obcordatum vel fere orbiculare, apice saepius valde emarginatum rarius apiculo interjecto, 12–22·5 mm. longum, 12–23·5 mm. latum, sed saepe longius quam latum, multinervium, disco ante orem calcaris puberulo ; hypochilium ex ore lato late conicum, apice obtusum ± emarginatum vel breviter bilobulatum, calcari 3–4·8 mm. longo, totum hypochilium 4·5–6·5 mm. longum. *Columna* erecta, 3·25–4·25 mm. longa, auriculis oblongis ; anthera mutica.

India. Pulney Hills, Sept. 1826, *Wight* Kew Distrib. 3025 (type, K ; BM) ; same locality, 2100 m., *Beddome* 8072 (BM) ; same locality, Kodaikanal, July 1897, *Bourne* s.n. ; as last, Iantha swamp, July 1899, *Bourne* 2954 ; below Sidcot, July 1898, *Bourne* 1189 ; Bear Shola, slopes at head, July 1899, *Bourne* 2953 ; Gundon Valley, river slopes, June 1897, *Bourne* 585 ; Perumal-malai, May 1897, *Bourne* 155 ; same locality, Arundina path, June 1901, *Bourne* 1537 ; Shembaganur, 1800 m. alt., *Anglade* 973 ; Anamalai Hills, 1200 m. alt., *Beddome* 8073 (BM).

It seems that the specimens of this species collected by Wight were identified by him as his *Platanthera iantha* and are responsible in part for his remarks about that species following his description of *P. affinis*. The present species agrees with true *B. iantha* in the adnation of the petals and dorsal sepal but differs in the much larger flowers and more clearly defined inflorescence. The labellum epichile is also broader at the base and the hypochile is relatively smaller.

9. **Brachycorythis galeandra** (*Rchb. f.*) *Summerhayes*, comb. nov.

Platanthera galeandra Rchb. f. in Linnaea, **25,** 226 (1852).

P. championi Lindl. in Hook. Kew Journ. Bot. **7,** 37 (1855).

Habenaria galeandra (Rchb. f.) Benth. Fl. Hongkong. 363 (1861) ; Hook. f. Fl. Brit. Ind. **6,** 163 (1891), pro minima parte.

Gymnadenia galeandra (Rchb. f.) Rchb. f. Otia Bot. Hamburg. 33 (1878).

Habenaria galeandra, var. *major* Hook. f. Fl. Brit. Ind. **6,** 164 (1891).

Platanthera truncatolabellata Hayata, Ic. Pl. Formos. **4,** 124, fig. 6 (1914).

Phyllomphax championi (Lindl.) Schltr. in Fedde, Repert. Spec. Nov. Beih. **4,** 119 (1919).

P. truncatolabellata (Hayata) Schltr. l.c. (1919).

Habenaria galeandra, var. *annamica* Gagnep. in Lecomte, Fl. Gén. Indo-Chine, **6,** 598 (1934).

Hongkong. 1845, *Fortune* 78 (type W, not seen ; K, BM) ; Mt. Victoria, July 1847, *Champion* 270 ; no date, *Hance* 105 ; 1853–56, *Wright* 525 ; top of ridge, June 1859, *Urquhart* ; May 1870, *Hance* 738 (K, BM) ; grassy hill slopes, very common, June 1885, *Sampson* 659 (BM) ; Lantao Island, May 1888, *native collector* Hongkong Bot. Gard. 47/88.

Formosa. Bankingsin, on mountains, *Henry* 850 ; Nanto, Randaizan, July 1907, *Kuwakami & Mori* 3482 (Herb. Tokyo, not seen).

India. Assam, Khasia Hills, 900–1800 m. alt., *Hooker & Thomson* 249 ; Myrung, July 1850, *Hooker & Thomson* (K, BM) ; Churra, June 1850, *Hooker & Thomson* 1013 ; Khasia Hills, *Lobb* ; same locality, *Griffith* Kew Distrib. 5304 ; July 1851, *Simons* (BM) ; Naga Hills, Kohima, July 1886, *Prain* 13 ; Khizobama, 1500–1800 m. alt., July 1935, *Bor* 5100 ; Shillong, 1350 m. alt., July 1886, *Clarke* 44281 (BM) ; same locality, 1500 m. alt., July 1885, *Clarke* 38345A (BM).

Burma. Kachin Hills, Metkina, June 1899, *Shaik Mokim* 22 (K, BM).

Annam. Les Planches, near Dalat, *Evrard* (P, not seen) ; Lang-bian, *Jacquet* (P, not seen).

Although the distribution of this species is markedly discontinuous so far as concerns the records up to the present, it does not seem advisable to divide the species into distinct geographical subspecies on the material available. The Indian and Burmese specimens are larger, with on the average larger flowers, while the Annamese specimens seem stunted, in comparison with the Hongkong plants from which the species was first described. It would seem desirable to obtain further gatherings and to explore the intervening country more completely before making any subspecific groupings.

Several authors who have dealt with the group (e.g. J. D. Hooker and Kraenzlin) have held a much wider concept of *B. galeandra*, including in it such distinct species as *B. obcordata* (Lindl.) Summerh., *B. iantha* (Wight) Summerh., and other South Indian species.

10. **Brachycorythis wightii** *Summerhayes*, sp. nov.

Habenaria iantha Hook. f. Fl. Brit. Ind. **6,** 164 (1891), quoad descr., partim, excl. syn.

Herba terrestris, erecta, 18–34 cm. alta, tuberis exceptis fere omnino glabra. *Tubera* (unum visum tantum) ovoidea, circiter 1·7 cm. longa et 1·2 cm. diametro, dense lanuginosa. *Caulis* valde foliosus, rectus vel leviter flexuosus, teres vel siccitate leviter plurisulcatus, 2–4 mm. diametro. *Folia* 10–15, crebre imbricata, erecto-patentia, infima ad vaginas redacta, superiora lanceolata vel ovato-lanceolata, acuminata, usque ad 4–6 cm. longa et 2–2·7 cm. lata, sursum decrescentia in bracteas abeuntia, chartacea, marginibus eciliatis. *Inflorescentia* terminalis, dense vel sub-laxe 6–20-flora, usque ad 18 cm. longa, 3–5 cm. diametro ; rhachis interdum leviter fractiflexa, teres, glabra, 1–2 mm. diametro ; bracteae foliis similes, lanceolatae, acutae, usque ad 4 cm. longae et 2 cm. latae, sursum decrescentes, inferiores saepius flores superantes, superiores floribus breviores. *Flores* patentes vel erecto-patentes, rosei ; pedicellus cum ovario curvatus vel leviter arcuatus, 1·5–1·8 cm. longus, brevissime papillatus. *Sepalum* intermedium lanceolatum, erectum, acutum vel acuminatum, 12·5–13·5 mm. longum, 3–3·5 mm. latum, trinervium ; sepala lateralia ± erecta, oblique lanceolata, acuminata, 14–14·5 mm. longa, 3–4 mm. lata, quadrinervia ; sepala cum petalis adpressa galeam

acutam formantia, sed omnia libera vel petalis cum sepalo intermedio leviter adhaerentibus tantum. *Petala* oblique lanceolata vel anguste lanceolata, acuta, circiter 12·5 mm. longa, 2–3 mm. lata. *Labellum* porrectum, in toto 20–22 mm. longum ; epichilium obovato-orbiculare vel obcordato-reniforme, apice ± emarginatum apiculo magno triangulari interposito, 12–20 mm. longum, 11–23 mm. latum ; hypochilium ex ore 3–4 mm. lato late conicum, in toto 6·5–7 mm. longum, calcari apice obtuso, leviter incurvato circiter 5 mm. longo. *Columna* erecta, crassiuscula, 3·5–4 mm. longa, auriculis oblongis emarginatis vel fere bilobulatis ; anthera mutica, canalibus nullis ; rostelli lobus intermedius brevis, plicatus, ± cucullatus.

India. Travancore, 1836, *Wight* 1031 (type K ; BM) ; Travancore boundary, on the hills, July 1886, *Bourdillon*.

The specimens of this species collected by Wight, like those of *B. splendida*, were probably referred by him to his *Platanthera iantha* and contribute to his remarks under the description of *P. affinis*. *Brachycorythis wightii* is very similar to *B. splendida* but it is a more densely leafy plant with the inflorescence less clearly defined from the rest of the plant. The tepals are all quite or almost free from one another, instead of the three dorsal ones (sepal and 2 petals) being firmly attached to one another as in *B. splendida*.

11. **Brachycorythis obcordata** (*Lindl.*) *Summerhayes*, comb. nov.

Orchis obcordata Buch.-Ham. ex Don, Prodr. Fl. Nepal. 23 (1825), non Willem.

Platanthera obcordata Lindl. in Wall. Cat. n. 7050 A and B (1832), nomen, et Gen. & Sp. Orch. Pl. 290 (1835).

Gymnadenia obcordata (Lindl.) Rchb. f. Otia Bot. Hamburg. 32 (1878).

Habenaria obcordata (Lindl.) Fyson, Fl. Nilgiri & Pulney Hill-tops, **1,** 405 (1915), var. *typica* Fyson, l.c.

Phyllomphax obcordata (Lindl.) Schltr. in Fedde, Repert. Spec. Nov. Beih. **4,** 119 (1919), in obs.

India. Kangra, *Sahni* ; between Kalka and Ruen Kor Tal, 1885, *Drummond* 26385 ; Simla, 1800 m. alt., in grass on sunny slopes, Aug. 1886, *Collett* 348 ; Simla, beyond Elysium, July 1917, *Rich* 664 ; Kunawar, N.E. of Simla, 1886, *Drummond* 22256 ; descent to Manglad Valley, N.E. of Simla, 1500 m. alt., Aug. 1847, *Thomson* 1815 ; Bunasur, 1680 m. alt., 1844, *Edgeworth* 35 ; Mussoorie, 1869, *King* (BM) ; same locality, 1650 m. alt., Aug. 1898, *McKinnon* 21755 (K, BM) ; Kumaon, 1832, *Wallich* 7050B (K, BM) ; Jagesu, 2100 m. alt., *Strachey & Winterbottom* 40 (K, BM) ; Gari Valley, Aug. 1900, *Inayat* 24064 ; Naini Tal, Shimala, July 1900, *Inayat* 8 ; Spiti valley, between Naini Tal and Srinagar, 3750 m. alt., *Benham* (BM) ; Assam, Rupa, Balipara Frontier Post, 1800 m. alt., in open pasture or meadow, July 1938, *Ward* 13914 (BM).

Nepal. No locality, 1821, *Wallich* 7050A (K, type ; BM) ; *Buchanan* (BM) ; Baitadi, 1200 m. alt., on open hillside, July 1953, *Tyson* 131 (BM) ; Dor Chat, 1050 m. alt., Aug. 1935, *Bailey* (BM ; between Syabrubensi and Syarpagoan, 1500–1650 m. alt., in grassy ground, July 1949, *Polunin* 1317 (BM).

Bhutan. Kuru Chu, near Lingtsi, 2250 m. alt., on open hillside, July 1933, *Ludlow & Sherriff* 315 (BM, K) ; Punakla, 1350 m. alt., Aug. 1914, *Cooper* 2411 (BM) ; Tembje Punakka, 2100 m. alt. Aug. 1914, *Cooper* 2855 (BM) ; Gichho Rinakho, 2100 m. alt., Aug. 1914, *Cooper* 3163 (BM, ; valley of Kuru Chu, 1800 m. alt., in turf of open place in forest, Aug. 1915, *Cooper* 4374 (BM) ; Khoma, 1350 m. alt., on open grassy hillsides, *Ludlow, Sherriff & Hicks* 20897 (BM).

This is the most westerly of the species occuring in northern India extending from Assam in the east to the Kangra District west of Simla in

the west. It is also the earliest species of the genus to be described, though not as a *Brachycorythis*. J. D. Hooker, Kraenzlin and others included the species in their concept of *Habenaria galeandra* or *Platanthera galeandra*, as the case may be, but it is difficult to understand this. Even on examination of the earliest gatherings alone, *B. obcordata* is recognisable as a very distinct looking species, characterised by the dwarf habit, the peculiar leaf-arrangement and the rather distinct inflorescences of very small flowers. More recent collections fully bear out the constancy of this characteristic facies, which differentiates the species easily from all other Asiatic species of the genus except *B. thorelii*. It is interesting to note that the species otherwise closely resembles *B. macowaniana* Rchb. f. from South Africa which, however, has narrower and more acute leaves, apart from the floral differences. *B. thorelii*, which is known from only one gathering, may well be only a sub-species of *B. obcordata*, but the data available are not sufficient to make any decision.

Hooker (Fl. Brit. Ind. **6,** 164 : 1891) records the species from Hawalbagh in Central India and this is repeated by Kraenzlin. The label with the specimen reads " No. 414 Orchideae Cyrtopera flava. Hawalbaugh 19th July [year undecipherable]". It appears to me quite incredible that anyone could identify the present species as *Cyrtopera flava* and it therefore seems certain that the label does not apply to the plant in question. It is unlikely, in any case, that a species which otherwise has such a strictly Himalayan distribution should occur in Central India.

12. **Brachycorythis thorelii** (*Gagnep.*) *Summerhayes*, comb. nov.

Habenaria thorelii Gagnep. in Bull. Soc. Bot. France, **78,** 74 (1931), " thorelli ", et in Lecomte, Fl. Gén. Indo-Chine, **6,** 598 (1934).

Laos. Khon, Bassac, 1866–68, *Thorel* 2238 (type, P).

This is in general features very similar to *B. obcordata* (Lindl.) Summerh. of which it may prove to be an eastern sub-species. The species has been collected only once, however, so any decision will have to wait until our knowledge is greater. It differs from *B. obcordata* in the less clearly marked inflorescence and the more conical hypochile spur.

13. **Brachycorythis conica** (*Summerh.*) *Summerhayes*, comb. nov.

Diplacorçhis conica Summerh. in Kew Bull. **1938,** 141.

In view of the very markedly discontinuous distribution of *B. conica* it seems best to treat the local groups as sub-species especially as they show definite segregation of some of the characters. These subspecies are as follows.

subspecies **conica**

Plantae graciles ; folia laxa vel sublaxa, usque ad 4·5 cm. longa et 1·8 cm. lata ; inflorescentia pluri- vel multiflora, bracteis flores aequantibus vel paulo superantibus ; labelli epichilium obovatum vel elliptico-obovatum, apice ± truncatum, breviter trilobatum.

Gabon. Upper Ngounyé River, between Mouila and Missounda, in savanna, Dec. 1924, *Le Testu* 5143 (Herb. Le Testu) ; same area, Pangani plain, in the savanna of Les Echiras, Nov. 1924, *Le Testu* 5088 (type, K ; Herb. Le Testu).

Belgian Congo. Mayombe, Luvu, just S. of Tshela, in marshy herb savanna on white sand, Dec. 1952, *Callens* 3815 (K, BR).

This, the typical subspecies, is more slender than either of the other two with the leaves more laxly arranged. The epichile of the labellum is about as broad as long with a truncate apex divided into three very short lobes. The central one is triangular while the two lateral ones tend to be somewhat incurved. The margins are usually slightly sinuate. The spur of the hypochile is incurved conical with a rather narrow apex.

subspecies **longilabris** *Summerhayes*, subsp. nov.

Plantae satis robustae, valde foliosae ; folia dense imbricata, lanceolata, usque ad 6 cm. longa et 2·5 cm. lata ; inflorescentia dense multiflora, bracteis flores multo superantibus ; labelli epichilium ligulato-oblongum vel obovatum, fere duplo longius quam latum, apice breviter trilobatum.

Northern Rhodesia. Mwinilunga Distr., half a mile S.W. of Dobeka Bridge, on sandy plain in open, Jan. 1938, *Milne-Redhead* 3941 (type of sub-species, K ; PRE).

This is much more robust than the typical subspecies with a densely leafy stem and a dense many-flowered inflorescence as much as 16 cm. long and 3–4 cm. in diameter even excluding the projecting bracts. The labellum epichile is rather tongue-like and relatively fleshy so that the veins are very difficult to see even in dried material. The epichile is about 9–10 mm. long and rather more than half that in width (5·5–5·8 mm.), with the margins much crisped and very bluntly dentate. The hypochile spur is relatively thicker and more obtuse than in subsp. *conica*.

subspecies **transvaalensis** *Summerhayes*, subsp. nov.

[*Diplacorchis tenuior* non (Rchb. f.) Schltr. ; Pole-Evans, Fl. Pl. S. Africa, **13,** t. 494 (1933)].

Plantae graciles vel robustae, saepius valde foliosae ; folia rarius laxa, saepius dense imbricata, lanceolata vel late lanceolata, usque ad 7 cm. longa et 2·5 cm. lata ; inflorescentia dense multiflora, bracteis flores ± superantibus ; labelli epichilium obovatum, quadratum vel fere orbiculare, antice truncatum breviter trilobatum vel rarius emarginatum bilobatum.

Transvaal. Pretoria District, between Ashbury and Zwartkop Aërodrome, in grassland on tops of hills, in sandy gravels, April 1930, *Nouhuys* Nat. Herb. 8460 (type, K ; PRE) ; Water Kloof, on hillside among grass, Feb. 1920, *Verdoorn* 90 (PRE) ; Irene, just S. of Pretoria, Nov. 1923, *Pole-Evans* (PRE) ; Donkerhoek, in moist swampy ground near stream, Jan. 1940, *Repton* 1309 (PRE) ; Pretoria, Feb. 1944, *Crundall* (PRE) ; Ashbury, March 1925, *Nouhuys* (PRE) ; Middelburg District, Roos Senekal, Jan. 1918, *Leipoldt* Herb. Bolus, 17074 (PRE).

This subspecies, like the others, appears to have a relatively restricted distribution, occurring only in part of the Transvaal. It is a rather robust plant, somewhat similar to subsp. *longilabris* in general appearance, though smaller specimens approach subsp. *conica*. In subsp. *transvaalensis* the epichile of the labellum is relatively broad and usually shortly trilobed at the apex ; in the specimen figured in the " Flowering Plants of South Africa " the central lobe is very small and the epichile therefore appears to be bilobed.

14. **Brachycorythis disoides** (*Ridl.*) *Kraenzl.* Orch. Gen. et Sp. **1,** 543 (1898).

Habenaria disoides Ridl. in Journ. Linn. Soc. Lond. Bot. **21,** 511 (1885).

Diplacorchis disoides (Ridl.) Schltr. in Beih. Bot. Centralbl. **38,** ii. 131 (1921) ; H. Perrier in Humbert, Fl. Madag. Orch. **1,** 9 (1939).

Madagascar. Ankafana, 1880, *Deans Cowan* (type, BM) ; Betsileo-land, *Baron* 194 ; Ankaratra Mts., amongst grass on summits, Feb., *Scott-Elliot* 1969 ; near Antsirabe, 1900 m. alt., in marsh, Jan. 1914, *Perrier* 8094 (P, K) ; near Ambatolampy, 1800 m. alt., Feb. 1925, *Perrier* 17907 (P, K) ; Tsinjoarivo, *Perrier* 17101 (P, not seen) ; near Ambatofinandrahana, *Decary* 12913 (P, not seen).

This and *B. pleistophylla* Rchb. f. are the only two species so far recorded from the Mascarene area in its widest sense ; both occur in Madagascar only. *B. disoides* is characterised by its dense inflorescence in which the bracts are usually shorter than the flowers, and by the distinctly forked hypochile spur. As in other species referred to *Diplacorchis* by Schlechter the two decurrent sides of the labellum hypochile terminate rather abruptly on the base of the epichile.

15. **Brachycorythis rhodostachys** (*Schltr.*) *Summerhayes*, comb. nov.

Platanthera rhodostachys Schltr. in Warb. Kun.-Samb.-Exped. 203 (1903).

Gyaladenia rhodostachys (Schltr.) Schltr. in Beih. Bot. Centralbl. **38,** ii. 126 (1921) ; Mansf. in Fedde, Repert. Spec. Nov. Beih. **68,** t. 4, no. 16 (1932).

Belgian Congo. Bas Congo, Wombali, on R. Kasai, *Van Tilborg* (BR).

Angola. R. Kubango, above Kucio, 1120 m. alt., Nov. 1899, *Baum* 381 (B, type, destroyed ; BM) ; R. Longa, near Chijija, 1200 m. alt., in marshy meadow, Jan. 1900, *Baum* 629 (B, destroyed).

Northern Rhodesia. Mwinilunga Distr., Sinkabolo Dambo, in boggy grassland, Nov. 1937, *Milne-Redhead* 3203 (K, BM).

A small-flowered species with dense inflorescences and rather laxly leafy stem. The spur is broadly incurved conical and distinctly emarginate at the apex. The flowers are reddish or purplish mauve, the labellum with bright mauve lines and spots on a yellowish-white ground, the markings sometimes being almost completely confluent leaving only a white margin.

16. **Brachycorythis friesii** (*Schltr.*) *Summerhayes*, comb. nov.

Platanthera friesii Schltr. in R. E. Fries, Wiss. Ergebn. Schwed. Rhod.-Kongo-Exped. 1911–12, **1,** 240, fig. 22 (1916).

Gyaladenia friesii (Schltr.) Schltr. in Beih. Bot. Centralbl. **38,** ii, 126 (1921) ; Mansf. in Fedde, Repert. Spec. Nov. Beih. **68,** t. 4, no. 15 (1932).

Urundi. Bururi, Niamlikiwe, on sandy fresh soil, Oct. 1932, *Becquet* 156 (BR) ; mountains S. of L. Kivu, in treeless alpine meadows, Dec. 1911, *Fries* 2010 (type, S).

Belgian Congo. Nyakalenzo, Kamembe, 1700 m. alt., in pastures, Nov. 1934, *Becquet* 826 (BR) ; Bissagni, 12 km. W. of Costermansville, 2100 m. alt., in pastures, Nov. 1939, *Rossignol* 221 (BR) ; Lurala, 2100 m. alt., in mountain pastures, Nov. 1939, *Rossignol* 206 (BR) ; Upemba National Park, Kaharoro R., tributary of R. Lupule, 1250 m. alt., in small marsh in forest, Nov. 1947, *De Witte* 3093 (BR).

Tanganyika Territory. Kahama Distr., 40 miles S. of Nungwe, Emin Pasha Gulf, 1320 m. alt., in damp glade in open forest, Jan. 1937, *Morgan* 84 (BM).

Angola. Bie Distr., Munongue, Cassuango, by R. Curiri, in damp meadows, Oct. 1906, *Gossweiler* 3285 COI, K ; same locality, Nov. 1906, *Gossweiler* 3906 COI.

Northern Rhodesia. Abercorn Distr., escarpment above Chilongowelo, 1500 m. alt., Dec. 1951, *Richards* 37.

A rather slender little plant with 4–14 narrow usually laxly arranged leaves and a short usually few-flowered inflorescence of relatively large flowers. The epichile of the labellum is usually more or less three-lobed in the lower part with a large orbicular or quadrate middle lobe and two narrow spreading very much smaller lateral lobes. There is a good deal of variation in the extent to which these lateral lobes are developed in individual flowers or specimens and sometimes one or both of them are scarcely differentiated. The spur is slender and relatively long.

17. **Brachycorythis macowaniana** *Rchb. f.* Otia Bot. Hamburg. 104 (1881) ; Kraenzl. Orch. Gen. et Sp. **1,** 545 (1898).

Habenaria macowaniana Rchb. f. N.E. Br. in Gard. Chron. ser. 3. **5,** 168 (1889).

Gymnadenia macowaniana Rchb. f. Schltr. in Verh. Bot. Ver. Brandenb. **35,** 46 (1893).

Platanthera macowaniana Rchb. f. Schltr. in Engl. Bot. Jahrb. **20,** Beibl. l. 12 1895 ; Bolus. Ic. Orch. Austr.-Afr. **1,** t. 59 1896 ; Rolfe in Dyer, Fl. Cap. **5,** iii. 89 (1912).

Gyaladenia macowaniana Rchb. f. Schltr. in Beih. Bot. Centralbl. **38,** ii. 125 (1921).

Cape Province. Riversdale Div., slopes of Langeberg Range near Riversdale, 300 m. alt., Nov. 1892, *Schlechter* 1900 ; Knysna Div., grassy mountain near Knysna, 30 m. alt., Nov. 1893, *Neudigate* in Herb. MacOwan 1795 ; Albany Div., Grahamstown, Featherstone's Kloof, 660 m. alt., in grassland at summit, Nov. 1865, *MacOwan* 2627 type, K ; Grahamstown, *Turk* ; Howison's Poort Hills, 666 m. alt., Dec. 1898, *Galpin* 3090.

Another small species but in this case with closely over-lapping lanceolate or narrowly lanceolate leaves and the bracts often longer than the flowers. The labellum epichile is distinctly trilobed at about the middle with triangular acute lateral lobes and a rather longer and broader triangular-ovate middle lobe. The spur is cylindrical, scarcely tapering, with a rounded or slightly emarginate apex. The attachment of the petals to the column is very short, or they may even be quite free.

18. **Brachycorythis tenuior** *Rchb. f.* in Flora. **48,** 183 1865 ; Kraenzl. Orch. Gen. et Sp. **1,** 543 (1898).

Habenaria tenuior Rchb. f. N. E. Br. in Gard. Chron. ser. 2. **24,** 307 (1885).

Platanthera tenuior Rchb. f. Schltr. in Engl. Bot. Jahrb. **20,** Beibl. l. 12 1895 ; Bolus. Ic. Orch. Austr.-Afr. **1,** t. 61 1896 ; Rolfe in Dyer. Fl. Trop. Afr. **7,** 205 1898 et in Dyer. Fl. Cap. **5,** iii. 88 (1912).

Brachycorythis engleriana Kraenzl. in Engl. Bot. Jahrb. **22,** 20 1895 ; Kraenzl. Orch. Gen. et Sp. **1,** 547 (1898).

Platanthera engleriana Kraenzl. Rolfe in Dyer, Fl. Trop. Afr. **7,** 204 (1898).

Brachycorythis rhombogiossa Kraenzl. Orch. Gen. et Sp. **1,** 544 (1898).

B. soyauxiana Kraenzl. l.c. 546 (1898).

B. sibangensis Kraenzl. l.c. 547 (1898).

Epipogon kassnerianum Kraenzl. in Engl. Bot. Jahrb. **51,** 370 (1914).

Diplacorchis tenuior (Rchb. f.) Schltr. in Beih. Bot. Centralbl. **38,** ii, 128 (1921).

D. rhomboglossa (Kraenzl.) Schltr. l.c. 129 (1921).

D. engleriana (Kraenzl.) Schltr. l.c. 129 (1921) ; Summerh. in Hutch. & J. M. Dalz. Fl. W. Trop. Afr. **2,** 407 (1936).

D. angolensis Schltr. l.c. 130 (1921) ; Mansf. in Fedde, Repert. Spec. Nov. Beih. **68,** t. 4, no. 14 (1932).

Brachycorythis crassicornis Kraenzl. in Vierteljahrsschr. Nat. Ges. Zürich, **74,** 103 (1929).

French Guinea. Nimba Mts., on summits, 1600 m. alt., in grasslands, July 1942, *Schnell* 1558b ; same locality, in grassland, Aug. 1947, *Schnell* 3379 ; Massif de Fon, on summits, 1600 m. alt., in grassland, July 1945, *Schnell* 3098b ; same locality, Aug. 1947, *Schnell* 3317.

Northern Nigeria. Munshi Prov., Katsina Allah, in swamp, Aug. 1912, *Dalziel* 835.

French Cameroons. Jaunde, July 1891, *Zenker* 563 (B, destroyed ; drawing K).

Gabon. Sibange Farm, in gallery forest, Jan. 1882, *Soyaux* 348 (B, not seen), 365 (B, destroyed ; drawing K) ; Libreville, in grassland, Nov. 1894, *Thollon* 164 (P).

Oubangui-Chari. Near Kéyoredé, 17 km. S. of Ippy (N.E. of Bambari), in marsh, July 1925, *Tisserant* 1194b (Herb. Le Testu).

Belgian Congo. Uele, Garamba National Park, on central range, 800–900 m. alt., in *Protea* savanna, Aug. 1952, *Troupin* 1926 (K, BR) ; Uele, just W. of Oleiba, Uganda, 1440 m. alt., in damp ground by small stream among tall grass, Aug. 1953, *Chancellor* 92 ; Sankuru R., Oct. 1910, *Kassner* 3323 (BM) ; between Lusambo and Lomami, in scrub, Dec. 1895, *Laurent* (BR) ; Kasongo, Aug. 1896, *Dewèvre* 980 (BR) ; Katanga, Kitimbo, on river, under trees, Jan. 1908, *Kassner* 2356 (B, destroyed ; K, BM) ; 2352 (BM) ; valley of the Petit Luembe River, Feb. 1910, *Hock* (BR) ; near Elisabethville, on edges of shallow vleis, Jan. 1924, *von Hirschberg* 174 ; Elisabethville, near Lubumbashi, common, Jan. 1925, *von Hirschberg* 174 (BR).

Uganda. Mawokota, 1170 m. alt., Feb. 1905, *Brown* 171 ; Bugabe, Malisa, 1200 m. alt., in short grassy swamp, Sept. 1922, *Dümmer* 5533 ; Lira, July 1931, *Hancock* 2225.

Kenya Colony. Kakamega, 1500 m. alt., in marshy ground, July 1943, *Tweedie* 615 ; no locality, Feb. 1907, *Powell* 134.

Tanganyika Territory. Valley of upper Ruhudji River, near Lupembe, N. of river, March 1931, *Schlieben* 324 (BR) ; 451 (BR) ; 535 (BR, BM), 534 (BR).

Angola. R. Cuiriri, above Sobi, 300 m. (? 1300 m.) alt., Feb. 1900, *Baum* 694A (B, destroyed) ; Longa R. above Ninnesera, 1250 m. alt., Feb. 1900, *Baum* 694 (K, BM, COI) ; Huila, Vila de Ponte (Ganguelas), on margins of R. Cubango, in damp herbaceous vegetation, Dec. 1905, *Gossweiler* 1979 (COI) ; Moxico Distr., by R. Chibamba, on drier areas in boggy grassland on sandy soil, Jan. 1938, *Milne-Redhead* 4162 (K, PRE).

Northern Rhodesia. Abercorn Distr., Fwambo, 1894, *Carson* 11 ; Nahendo Park, 8 miles N. of Lusaka, 1200 m. alt., in open grassland on clay soil, Jan. 1954, *Best* 50.

Nyasaland. Blantyre, Jan. 1888, *Scott*.

Southern Rhodesia. Salisbury, Chakoma Vlei, 1350 m. alt., Jan. 1953, *Greatrex* in S.R. Gov. Herb. 41248 ; Salisbury, sparse in grassland, usually semi-vlei, Jan. 1945, *Greatrex* 22 (PRE) ; Inyanga Distr., Cheshire, 1300 m. alt., in damp soil, Jan. 1931, *Norlindh & Weimarck* 4397 ; same locality, 1350 m. alt., in grassland, Feb. 1931, *Norlindh & Weimarck* 4781 ; Melsetter Distr., Chimanimani Mts., 1650 m. alt., in spongy ground, Feb. 1954, *Ball* 218 (S.R. Gov. Herb. 47904).

Transvaal. Pietersburg Distr., Makapansberg, Strydpoort, 1875–1880, *Rehmann* 5390 ; Marabastad, 1410 m. alt., Feb. 1894, *Schlechter* 4349 (K, PRE) ; Middelburg Distr., Middelburg, March 1910, *Hewitt* 8042 ; Pretoria, University Experimental Farm, in open grassland, March 1953, *Marais* 258 (PRE) ; Heidelburg Distr., Uitgevallen Farm 197, near Vereenigung, Feb.–March 1915, *Burtt-Davy* 15230.

Natal. Ladysmith, 1895, *Schlechter* ; no locality. *Mrs. Saunders* ; Inanda, Jan. 1880, *Wood* 714 ; between Maritzburg and Bishopstone, 600 m. alt., Jan. 1869, *Sanderson* 1046 ; Port Natal, *Gueinzius* (type W, not seen ; tracing, K).

This species, which was divided into four species by Schlechter in his revision, is widely spread in Tropical Africa, extending into the Transvaal and Natal, from which latter country it was originally described. It is characterised by the long, curved, very obtuse spur to the hypochile and the marked decurrence of the sides of the hypochile on to the epichile as tall lamellae terminating rather abruptly in front.

The labellum epichile shows considerable variation in shape and on these variations the four species mentioned above have been based. The epichile consists of two relatively easily recognisable parts, namely a central and apical rather fleshy convex portion and a lateral and basal flatter thinner region. It is in the different relative development of these two parts that the main variations occur. In some plants the basal flatter portion is very short and terminated towards the front by margins more or less at right angles to the central portion, forming distinct lateral lobes, the central convex part projecting in front as a long tongue. To this type belong the specimens recognised by Schlechter as *Diplacorchis engleriana* and *D. angolensis*. At the opposite extreme one finds epichiles in which the convex portion is restricted to the very apex, forming a short apical lobe, the flattened broader part making up the greater part of the epichile and not forming distinct lateral lobes. This is the type called by Schlechter *D. rhomboglossa*. The type of structure found in the original *B. tenuior* lies between these two extremes, the basal flattened part blending gradually into the central tongue portion to form an almost unlobed structure broader towards the base. Examination of about 50 gatherings (see list above) shows that all intermediates occur between the two extremes mentioned above and the intermediate structure found in the type specimen and others agreeing with it.

There is a general preponderance of what we may call the " tenuior " type of epichile in more southerly parts of the range of the species while the " engleriana " type is commoner in the northern parts, but both types are found in all areas. The " rhomboglossa " type, in its most extreme form, seems to be restricted to the southern Belgian Congo, eastern Angola and the two Rhodesias and might be looked upon as an incipient subspecies. It is not well enough defined, however, to be treated fully in this manner.

19. **Brachycorythis sceptrum** *Schltr.* in Beih. Bot. Centralbl. **38,** ii. 114 (1921).

Diplacorchis ashantensis Summerh. in Kew Bull. **1931,** 378.

French Guinea. Kindia, on damp stony ground, Aug. 1905, *Pobéguin* 1375 (P).

Gold Coast. Ashanti, Northern Province, Anoma, in grass savanna, July 1913, *Chipp* 531.

British Cameroons. N. of Bakossi Mts., 1000 m. alt., in grassland, July 1902, *Walker* (syntype, B, destroyed).

French Cameroons. Dirdu, near Garua, 600 m. alt., in swampy ground, July 1911, *Range* 80 (syntype, B, destroyed) ; Meiganga, in grassland, July 1939, *Jacques-Félix* 4457 (P) ; between Ngaou Ndéré and Meiganga, in grassland, June 1939, *Jacques-Félix* 4086 (P) ; Ngou region, between Ngaou Ndéré and Meiganga, in grassland, June 1939, *Jacques-Félix* 4305 (P).

Oubangui-Chari. Bambari, near Moronbas, July 1922, *Tisserant* 640 (P).

Unfortunately the two syn-type specimens of this species were destroyed during the recent war so it has not been possible to examine them. There is no doubt, however, from the description that they were conspecific with the three Jacques-Félix gatherings cited above which came from the same general area.

In the Gold Coast and French Guinea specimens the labellum epichile is somewhat narrower and more quadrate than in the Cameroons specimens but in all other respects there is very good agreement.

20. **Brachycorythis congoensis** *Kraenzl.* Orch. Gen. et Sp. **1,** 544 (1898) ; Schltr. in Beih. Bot. Centralbl. **38,** ii. 120 (1921) ; Braid in Kew Bull. **1925,** 359.

B. hirschbergii Braid in Kew Bull. **1925,** 358.

Urundi. Nyabitare, Mollo, slopes of Mt. Wabiterama, Nov. 1951, *Michel & Reed* 685 (BR) ; Kiofi, Mollo, Nov. 1951, *Michel & Reed* 987 (BR).

Belgian Congo. Sankuru Distr., Lubifu-Lusembo, Sept. 1910, *Kassner* 3319 (BM) ; Tanganika Distr., Haut Marungu, Jan. 1895, *Debeerst* 81 (type, BR) ; Haut Katanga Distr., Lubumbashi Valley, at edges of vleis, Nov. 1923, *Von Hirschberg* 134 ; same locality, Dec. 1924, *Von Hirschberg* 134 (BR) ; Elisabethville, Kafubo River, on banks, Oct. 1911, *Hock* (BR) ; Kafubu, in forest, Jan. 1923, *De Giorgi* 359 (BR) ; Keyberg, 8 km. S. of Elisabethville, grassland in very damp valley, Jan. 1951, *Schmitz* 3341 (BR) ; Welgelegen, 1912, *Florent* 652 (BR) ; R. Kapemba, on banks of stream, Jan. 1923 *De Giorgi* 402 (BR) ; Katuba, Droogmans Farm, Dec. 1927, *Quarré* 935 (BR).

Tanganyika Territory. Kigoma Distr., Kasulu, 1350 m. alt., on red clay loam, Dec. 1930, *Rounce* D7 ; between Kibondo and Kasulu, in deep red clay soil, Dec. 1949, *Shabani* 82.

Northern Rhodesia. Abercorn Distr., Nakatali near Abercorn, in open grassy dambo in wet ground, Feb. 1951, *Bullock* 3653 ; Batok Distr., Muckle Neuk, 12 miles N. of Choma, 1230 m. alt., in dambo, Jan. 1954, *Robinson* 459.

Southern Rhodesia. Umvukwes Distr., Mazoe, Ruorka Ranch, 1650 m. alt., in dryish vlei, Dec. 1952, *Wild* 3996 (S.R. Gov. Herb. 40816) ; Melsetter Distr., 10 miles W. of Melsetter, 1500 m. alt., in vleis, Dec. 1952, *Crook* 426 (S.R. Gov. Herb. 41243) ; Matabeleland, Nov. 1928, *Cheesman* 14 (BM) ; Victoria, 1909–12, *Monro* 1878 (BM).

The short rounded hypochile spur, and the usually distinctly trilobed epichile with the middle lobe longer than the laterals and truncate or emarginate at the apex are characteristic of the species. Another distinctive feature is the shape of the petals which are usually obliquely ligulate with the apex more or less emarginate or rounded truncate. The leafiness of the stem and density of the inflorescence vary from plant to plant but in general features the plant is a characteristic member of the genus. The specimens described respectively by Kraenzlin and by Braid (the latter as *B. hirschbergii*) represent opposite extremes in many features but are connected by numerous intermediates ; as regards the spur, petal shape, and column structure they agree closely.

21. **Brachycorythis angolensis** (*Schltr.*) *Schltr.* in Beih. Bot. Centralbl. **38,** ii. 113 (1921), excl. *B. oligophylla* Kraenzl. ; Mansf. in Fedde, Repert. Spec. Nov. Beih. **68,** t. 2, no. 8 (1932).

Platanthera angolensis Schltr. in Warb. Kun.-Samb.-Exped. 203 (1903).

Angola. Ganda, 2160 m. alt., in swamps, Nov. 1937, *Pittard* 77 (BM) ; Huambo Mission, 5 km. to E., in marsh, Nov. 1942, *Tisserant* 326 (COI) ; same locality, in marsh to south, Nov. 1942, *Tisserant* A260 (COI) ; Cuebe River, Matungue, 1250 m. alt., Oct. 1899, *Baum* (type, B, destroyed ; K, BM, COI) ; Cuiriri River, Cassuango, in damp herbaceous vegetation, Oct. 1906, *Gossweiler* 3279 (COI, K) ; 3292 (COI, K).

Northern Rhodesia. Mwinilunga Distr., Sinkabolo Dambo, in boggy grassland, Nov. 1937, *Milne-Redhead* 3201 ; just S. of Dobeka Bridge, in boggy grassland, Nov. 1937, *Milne-Redhead* 3201A ; just NW. of Dokeka Bridge, in boggy grassland, Dec. 1937, *Milne-Redhead* 3531.

In this species the cauline leaves are only 5 to 9 in number, either slightly or not at all overlapping ; much larger oblanceolate leaves are borne on separate stems much as in many species of *Disa*. The hypochile spur is broad and rounded ; the epichile is usually broader than long, more or less trilobed at the apex. The lobes may be very broad and rounded or triangular and subacute ; they are of approximately the same size but the middle one is almost always a little longer than the laterals.

22. **Brachycorythis oligophylla** *Kraenzl.* in Warb. Kun.-Samb.-Exped. 208 (1903).

B. angolensis Schltr. in Beih. Bot. Centralbl. **38,** ii. 113 (1921), partim.

Angola. Longa R., near Napalanka, 1150 m. alt., in swampy depression, Jan. 1900, *Baum* 614 (type, B, destroyed ; BM).

Northern Rhodesia. Mwinilunga Distr., Sinkabolo Dambo, in more or less waterlogged boggy grassland, Dec. 1937, *Milne-Redhead* 3567.

I am still a little uncertain as to whether this should be included under *B. angolensis* as a large-flowered form, as was evidently done by Schlechter, or maintained as a distinct species. It agrees with *B. angolensis* in general features but not only are the flowers distinctly larger but the whole inflorescence is much wider. Mr. Milne-Redhead, who collected both species in the same locality (his numbers 3201 and 3567), tells me that they looked very different in the field and their flowering was not simultaneous. It is possible that *B. oligophylla* is a tetraploid form of *B. angolensis* but until we have more information about both of these plants the matter clearly cannot be taken any further.

23. **Brachycorythis paucifolia** *Summerh.* in Kew Bull. **1947,** 123 (1948).

French Guinea. Nimba Mts., near Nzérékoré, 1800 m. alt., Oct. 1937, *Jacques-Félix* 1936 (P) ; Nimba Mts., grassland on summit, Sept. 1942, *Schnell* 1853 ; same locality and habitat, Aug. 1947, *Schnell* 3379, 3405.

Sierra Leone. Loma Mts., Da-Oulen, summit, 1570 m. alt., Aug. 1945, *Jaeger* 1327 (type, K) ; Loma Mts., Bintumane Massif, on NW. slope, 1500 m. alt., on damp rock-pavement, Aug. 1945, *Jaeger* 975 ; same locality, NE. slope, 1600 m. alt., on damp rock-pavement, Aug. 1945. *Jaeger* 1027 ; same locality, NW. slope, Aug. 1945, *Jaeger* 1132 ; Da-Oulen, in marshy clearings, Aug. 1945, *Jaeger* 1278.

A very distinct species characterised by the small number of relatively large leaves. These tend to be concentrated near the base with the lowermost leaves (except the basal ones which are sheath-like) considerably longer than the upper ones. Another striking feature is the large flowers (intermediate sepal over 1 cm. long and the remainder of the perianth in proportion) which occur in relatively few-flowered inflorescences. The hypochile spur is intermediate between types like *B. congoensis* Kraenzl. and *B. angolensis* (Schltr.) Schltr., with distinct rounded spur, and those like *B. ovata* Lindl. and *B. kalbreyeri* Rchb. f. in which there is no spur to the hypochile. *Jaeger* 1027 in the Kew Herbarium has a short lateral inflorescence arising from the axil of one of the middle leaves in addition to the terminal inflorescence, a feature I have seen in no other specimen of the genus.

24. **Brachycorythis inhambanensis** (*Schltr.*) *Schltr.* in Beih. Bot. Centralbl. **38,** ii. 112 (1921) ; Mansf. in Fedde, Repert. Spec. Nov. Beih. **68,** t. 3, no. 9 (1932).

Platanthera inhambanensis Schltr. in Engl. Bot. Jahrb. **26,** 330 (1899).

Northern Rhodesia. Mwinilunga Distr., S.W. of Dobeka Bridge, in boggy grassland, Dec. 1937, *Milne-Redhead* 3655 (K, BM).

Southern Rhodesia. Melsetter Distr., Chimanimani Mts., 1980 m. alt., in montane meadow, Jan. 1954, *Ball* 190 (S.R. Gov. Herb. 46246).

Mozambique. Near Inhambane, in marsh, Feb. 1898, *Schlechter* 12091 (type, B, destroyed).

Although I have not seen the type specimen of this species I think there is no doubt as to the identity of the other two gatherings cited. This is borne out by comparison with the published reproduction of the drawings on the type sheet (see reference above). It is not possible to say much about the distribution from so few gatherings but it is clear that the species occurs within wide altitudinal limits from near sea-level to nearly 2,000 metres.

25. **Brachycorythis buchananii** (*Schltr.*) *Rolfe* in Dyer, Fl. Trop. Afr. **7,** 570 (1898) ; Schltr. in Beih. Bot. Centralbl. **38,** ii. 113 (1921).

Platanthera buchananii Schltr. in Engl. Bot. Jahrb. **24,** 420 (1897).

Brachycorythis parviflora Rolfe in Dyer, Fl. Trop. Afr. **7,** 202 (1898).

Uganda. Ankole, Igara, 1650 m. alt., in short grassland, March 1939, *Purseglove* 609 ; Ankole, Bugamba, in grasslands, Nov. 1940, *Eggeling* 4228.

Kenya Colony. Kakamega, 1500 m. alt., in marshy ground with long grass, July 1943, *Carroll in Tweedie* 614.

Belgian Congo. Uele, Kampala (Nioka), in damp turf, June 1952, *Liben* 333 (BR) ; Uele, S.E. of Golu (N. of Mahagi) in terrace savanna, June 1952, *Sperry* 622 (BR) ; Katanga, Elisabethville, beyond Star Mine, abundant, Jan. 1924, *Von Hirschberg* 180 ; same locality, Jan. 1925, *Von Hirschberg* 180 (BR) ; 17 km. NW. of Elisabethville, in marshy grassland, Jan. 1952, *Schmitz* 3714 (BR) ; Katanga, Elakat, Marie-José, Jan. 1929, *Quarré* 1512 ; Katuba, 3 km. from C.S.K. Farm, Jan. 1927, *Quarré* 43 (BR).

Tanganyika Territory. Bukoba Distr., Ngoro Swamp on Uganda road, 1200 m. alt., Jan. 1932, *Haarer* 2432 ; Rungwe Distr., Kyimbila, 900–1500 m. alt., in montane meadows, Dec. 1910, *Stolz* 139 ; same locality, 1300–1500 m. alt., Jan. 1906, *Stolz* 139 (K, BM) ; Kyimbila, Bomalakitana, 900 m. alt., in montane meadows, Jan. 1910, *Stolz* 568.

Angola. Moxico Distr., half-a-mile E. of Lusavo Falls, in boggy grassland, Jan. 1938, *Milne-Redhead* 4104.

Northern Rhodesia. Mwinilunga Distr., by R. Kaoomba, in marshy ground, Dec. 1937, *Milne-Redhead* 3780 ; Nkana, in damp marshy places, Dec. 1936, *Brenan* 3 ; Abercorn Distr., Fwambo, 1560 m. alt., 1896, *Nutt* ; same area, Kali Dambo, 1500 m. alt., in very wet bog, Jan. 1952, *Richards* 784 ; Abercorn, Jan. 1937, *Ricardo* 531, 533 (both BM).

Nyasaland. No locality, 1894, *Buchanan* (type, B, destroyed) ; *Buchanan* 190 (BM) ; Kota-Kota Dambo, 510 m. alt., in grass 3 ft. high, Feb. 1944, *Benson* 296 ; Blantyre, Nyambadwe, in dambo near Mission dam, Feb. 1945, *Benson* 1067 ; same locality, Jan. 1945, *Benson* 1076.

Southern Rhodesia. Near Salisbury, Jan. 1912, *Craster* 79 ; no date, *Hislop* 396 ; Salisbury Distr., Swiswa, 1350 m. alt., in vlei, Feb. 1951, *Greatrex* S.R. Gov. Herb. 31804 ; Inyanga Distr., near Inyanga, by Niarerue stream, 1700 m. alt., in damp soil, Jan. 1931, *Norlindh & Weimarck* 4452.

Easily recognised by the small pink or mauve flowers in dense very narrow spikes with no projecting bracts and the broad trilobed labellum epichile with a prominent tooth-like callus at its base just in front of the hypochile. No similar callus is recorded from any other species of the

genus. The hypochile is boat-shaped with no spur development, the two sides being broadly triangular along their margins. The petals are broadly obovate, and attached to the whole length of the column below the auricles.

26. **Brachycorythis pleistophylla** *Rchb. f.* Otia Bot. Hamburg. 104 (1881) ; Rolfe in Dyer, Fl. Trop. Afr. **7,** 202 (1898) ; Kraenzl. Orch. Gen. et Sp. **1,** 540 (1898) ; Schltr. in Beih. Bot. Centralbl. **38,** ii. 117 (1921) ; H. Perrier in Humbert, Fl. Madag. Orch. **1,** 8 (1939).

Platanthera pleistophylla (Rchb. f.) Schltr. Westafr. Kauts. Exped. 274 (1900).

Brachycorythis briartiana Kraenzl. apud De Wildem. & Dur. in Bull. Soc. Bot. Belg. **38,** 219 (1900).

B. pulchra Schltr. in Engl. Bot. Jahrb. **53,** 485 (1915), partim ; et in Beih. Bot. Centralbl. **38,** ii. 116 (1921), partim ; Mansf. in Fedde, Repert. Spec. Nov. Beih. **68,** t. 3, no. 10 (1932).

B. perrieri Schltr. in Beih. Bot. Centralbl. **34,** ii. 296 (1916) ; et l.c. **38,** ii. 118 (1921) ; Mansf. l.c. t. 3, no. 11 (1932).

B. macclouniei Braid in Kew Bull. **1925,** 357.

This species has a wide distribution over the greater part of Tropical Africa and is characterised by the leaves being drawn out into long acuminate points and the vegetative parts turning black on drying. The hypochile is very small and semi-spherical with no spur formation ; the epichile has two large more or less connivent lateral lobes and often a much shorter small tooth-like lobe between them. The lateral lobes are more or less reflexed. The petals stand forward from the column instead of being upright along the column as in *B. ovata* Lindl. ; the parts of the flowers are also less fleshy than in that species.

The shape of the petals and labellum and the extent to which the *flowers* blacken on drying vary considerably and on the basis of these characters it is possible to recognise two subspecies.

subspecies **pleistophylla**.

Flores sicco ± nigrescentes ; petala semiorbicularia vel semiovata, medio vel sub medio latissima ; labelli epichilium longius quam latum vel aequilongum ac latum.

French Cameroons. R. Lom, 800 m. alt., May 1914, *Mildbraed* 9198.

Belgian Congo. Tanganika Prov., Tugulu, near Albertville, Nov. 1945, *Van Meel* 149 (BR) ; Lualaba Prov., Biano, *Homblé* (BR ; Mussima, *Briart* (BR) ; Haut Katanga Prov., Munama, Martin's Farm, in wooded savanna, in shade, April 1945, *Quvré* 7859 (BR) ; Manika Plateau, near Katentania, on plain, Nov. 1912, *Homblé* 793 (BR).

Urundi. Bururi, Katihab Chiefdom, towards Rivers Malagarasi and Rukoziri, Dec. 1932, *Robert* 14 (BR) ; S. of Lake Kivu, 1500 m. alt., Dec. 1906, *Wollaston* (BM).

A.-E. Sudan. Imatong Mts., Gilo, 1900 m. alt., in plantations formerly on grassland, May 1954, *Jackson* 3183.

Uganda. Kigezi, shores of Lake Mutanda, among bracken, Oct. 1940, *Eggeling* 4137 ; Acholi, Imatong Mts., 2100 m. alt., in grasslands, April 1938, *Eggeling* 3607 ; Imatong Mts., Langra, 2100 m. alt., in montane grassland, April 1943, *Purseglove* 1400.

Kenya Colony. Teita Distr., Mbololo Hill, at foot in swamp, Sept.–Oct. 1938, *Boy Joanna in Bally* 8919 ; Teita Range, Sagalla, Nov. 1938, *C.-van Someren* 115.

Tanganyika Territory. Usambara, near Mlalo, in scrub, Jan. 1892, *Holst* 253 (B, not seen) ; Korogwe Research Stn., 1700 m. alt., in forest, Dec. 1895, *Buchwald*

297 (B, not seen) ; Feb. 1896, *Buchwald* 461 (B, not seen) ; Uluguru Mts., Lukwangule, 2400 m. alt., in grassland, Jan. 1943, *Moreau* 280 ; Uluguru Mts., NW. side, 1250 m. alt., scattered among grass, Jan. 1933, *Schlieben* 3240 (BM) ; Ufipa, Mbisi, 2250 m. alt., on grassy slopes, Jan. 1950, *Bullock* 2246 ; Rungwe Distr., Tandala, 2100 m. alt., in mountain meadow, Dec. 1913, *Stolz* 2364 (K, BR, BM) ; Kyimbila, Mwassakuli Forest, 1400 m. alt., Jan. 1909, *Stolz* 190 ; same area, Bomalakitana, 900 m. alt., Jan. 1911, *Stolz* 463 ; Bundali Mts., Luswiswe Valley, 1200 m. alt., in montane meadow, Jan. 1912, *Stolz* 1063 (B, one specimen only) ; Livingstone Mts., Milo Distr., 2100 m. alt., in short grassland on partly clay soil, Feb. 1933, *Rae* A13 (BM).

Angola. Huambo Mission, SE. of Nova Lisboa, in wooded savanna, Nov. 1942, *Tisserant* A272 (COI) ; same locality, *Castro* 20 (COI).

Northern Rhodesia. Mwinilunga Distr., ½ mile W. of Dobeka Bridge, in *Cryptosepalum* woodland on sand, Nov. 1937, *Milne-Redhead* 3148 ; 1 mile N. of Mwinilunga, in *Brachystegia-Isoberlinia* woodland on heavy red soil, Nov. 1937, *Milne-Redhead* 3411 ; 1350–1500 m. alt., in bush, Nov.–Dec., *Marks* 104 ; Luangwa Distr., Mufulira, in woodland, Dec. 1947, *Cruse* 107.

Nyasaland. Mt. Milanji, 2100 m. alt., Oct. 1895, *McClounie*; same locality, Oct. 1891, *Whyte* (BM) ; no locality, 1891, *Buchanan* 1345 ; Mt. Malosa, 1200–1800 m. alt., Nov.–Dec. 1896, *Whyte* ; Kondowe to Karonga, 600–1800 m. alt., July 1896, *Whyte* ; Shire Highlands, Blantyre, *Last* ; Sotchi, Dec. 1894, *Scott Elliot* 8570 ; Chikala, 600 m. alt., Dec. 1900, *Purves* 101 ; Luchenza, Nasania Estate, 1350 m. alt., Dec. 1932, *Sharp* ; Mt. Waller, 1350 m. alt., Nov. 1932, *Sanderson* (BM) ; Nyika, near mile 30, among grass, Jan. 1953, *Chapman* 72 (BM).

Southern Rhodesia. Inyanga Distr., between Inyanga and falls of Pungwe River, 1800 m. alt., in grassland, Dec. 1930, *Fries et alia* 3755 (K, BM) ; below falls of R. Pungwe, 1500 m. alt., in grassland, Dec. 1930, *Fries et alia* 3962 ; Mt. Nuza Plateau, in vlei, Nov. 1934, *Gilliland* 1507 (K, BM) ; iNyumquarara, Mutsatsa, 1934, *Gilliland* 1313 (BM) ; Melsetter, Blands Folly vlei, 1500 m. alt., Dec. 1952, *Crook* 423 (S.R. Gov. Herb. 41240) ; Mt. Silinda, Gungunyana Farm, in *Uapaca* bushveld, Dec. 1937, *Obermeijer* 2232.

Mozambique. Morumballa, 900 m. alt., Dec. 1858, *Kirk* (type, K).

Madagascar. Mt. Tsaratanana, 1400 m. alt., in dry forests, *Perrier* 11361 (type B, destroyed ; P, not seen) ; Mrangaba Plateau, S. of Mt. Tsaratanana, 1500 m. alt., in, grassland, Oct. 1922, *Perrier* 15171 (P, not seen) ; Upper Sambirano, *Humbert* 18575 (P, not seen).

The typical sub-species has a wide distribution throughout most of the savanna regions of Tropical Africa except " Upper Guinea ". It shows considerable variation in stature and robustness as well as in the width of the leaves. There is also a good deal of variation in the exact shape and details of the labellum epichile but on the whole this is a good deal narrower than in subspecies *leopoldii*. The side lobes may be rounded, or quite acute as in *B. macclouniei* Braid, while the development of the small central lobe is very variable or this lobe is lacking. The petals are usually widest at or just below the middle but in some plants they are wider farther up and in this respect approach those of subsp. *leopoldii*.

I have not seen any material of *B. perrieri* Schltr. from Madagascar, but from the descriptions and illustrations, and from Perrier's remarks, I have little doubt of its identity with *B. pleistophylla* subsp. *pleistophylla*.

All the specimens I have seen of this subspecies have flowers drying almost black or very dark brown, giving the specimens a very different appearance from those of subsp. *leopoldii* in which the flowers on drying range from very pale brown to a medium but distinct brown.

subspecies **leopoldii** (*Kraenzl.*) *Summerhayes*, stat. nov.

Brachycorythis leopoldii Kraenzl. Orch. Gen. et Sp. **1,** 542 (1898) ; Schltr. in Beih. Bot. Centralbl. **38,** ii. 117 (1921).

B. pulchra Schltr. in Engl. Bot. Jahrb. **53,** 485 (1915), excl. spec. leg. *Stolz* 2364, et in Beih. Bot. Centralbl. **38,** ii. 116 (1921), excl. spec. leg. *Stolz* 2364.

Flores sicco haud nigrescentes ; petala semiorbicularia, late oblique obovata vel transverse semi-elliptica, saepissime supra medium latissima ; labelli epichilium saepius latius quam longum.

GABON. Moumbassi, in savanna, Dec. 1907, *Le Testu* 1256 (P) ; Upper Ogoué River, Banigha, in savanna on bank of river, Nov. 1929, *Le Testu* 7670 (P, Herb. Le Testu) ; Massaga, Nov. 1910, *Le Testu* 1665 (P).

FRENCH CONGO. Kitobi, Sept. 1893, *Lecomte* A76 (P).

BELGIAN CONGO. Mayombe, Migimgu, in grassland, Dec. 1922, *Wellens* 227 (BR) ; Vaku, in grassland, common, Dec. 1923, *Wellens* 484 (BR) ; Mayombe, no locality, in the bush, 1903, *Deleval* (BR) ; Bas Congo, M'vuazi, in herb savanna, Oct. 1947, *Devred* 40 (BR) ; Kinchassa, Sept. 1899, *Schlechter* 12797 (K, BR, BM) ; Tumba, Oct. 1902, *Cabra* 56 (BR) ; Zulu, Bamboto, Oct. 1915, *Vanderyst* 5757 (BR) ; Sanda, Nov. 1908, *Vanderyst* (BR) ; same locality, in bush, Oct. 1903, *Vermeulen* 3421 (BR) ; Stanley Pool, Banza-Boma, on hills, in clay soil, Oct. 1898, *Luja* 75a (BR) ; same locality, in marsh, Oct. 1948, *Callens* 1886 (BR) ; Stanley Pool, on caravan routes, Oct. 1895, *E. Laurent* (type, BR) ; Bas Congo, no locality, Dec. 1900, *Butaye* (BR) ; 1902, *Butaye*, (K, BR) ; Lemfu, 1901, *Butaye* 2270 (BR) ; Boko, 1907, *Vanderyst* (BR) ; Kipako, Oct. 1924, *Vanderyst* 13648 (BR) ; Lac Léopold II Distr., Wombali, at mouth of Kwango R., *Van Tilborg* (BR) ; Kwango Distr., between Kingundji (Kingushi) and Mbau, 1925, *Vanderyst* 16480 (BR), 16575 (BR) ; Sankuru Distr., between Lubefu and Lusambo, Sept. 1910, *Kassner* 3309 (BM) ; Haut Lomami Distr., Kapanga, on sandy plateau, Sept. 1933, *Overlaet* 837 (BR) ; same locality, in wooded savanna on red soil, Oct. 1933, *Overlaet* 850 (BR) ; same locality and habitat, Sept. 1933, *Overlaet* 833 (BR) ; Kamina, 1100 m. alt., in marshy grassland, *Mullenders* 1424 (BR) ; Lutembue R., tributary of R. Lubudi, SW. of Bukama, 1891, *Descamps* (BR) ; Lualaba Distr., Biano Plateau, Grelco, 1600 m. alt., Oct. 1939, *Quarré* 5961 (BR) ; Katanga, Loonya River, Oct. 1930, *Quarré* 2134 (BR) ; Loosi River, Nov. 1910, *Kassner* 3343 (BM) ; Nikondama, Nov. 1902, *Hock* (BR) ; near Elisabethville, in woody places, fairly common, Nov. 1923, *Von Hirschberg* 133 ; Lubumbashi River, in gallery forest, Nov. 1927, *Quarré* 902 (BR) ; Elisabethville, Kaponda Road, 1350–1440 m. alt., Nov. 1924, *Von Hirschberg* 133 (BR) ; E. Muknen, 10 km. S. of Elisabethville, in dambo of plateau, Dec. 1952, *Schmitz* 4249 (BR).

TANGANYIKA TERRITORY. Rungwe Distr., Bundali Mts., Luswiswi Valley, 1200 m. alt., in montane meadow, Jan. 1912, *Stolz* 1063 (B, destroyed, photo. K ; K) ; Ulanga Distr., near Mahenge, 900–1000 m. alt., in rocky savanna, Dec. 1931, *Schlieben* 1596 (BR) ; Songea Distr., Matengo, between Umgano and Utindi, 1500 m. alt., in open bush grassland on red soil, Jan. 1937, *Zimmer* 244 (BM).

This subspecies appears to replace the typical subspecies in the savanna regions immediately to the south and west of the central Congo Forest, from Gabon in the west nearly to the Katanga in the east. It also occurs in Katanga and in southern Tanganyika Territory, but there it grows sometimes with the typical form. It can be distinguished by the much broader petals and labellum, the petals being usually widest in the upper half with a complicated system of branched veins. In drying the flowers turn only pale to medium brown, being much paler than in subsp. *pleistophylla*. I have seen quite a number of intermediate forms, some of which may be hybrids, but there is no definite evidence with respect to hybridisation. Evidently this is a group where population studies are badly needed, particularly in the two areas where both subspecies occur.

The species described by Schlechter as *B. pulchra* consists, as a photograph of the type sheet (*Stolz* 1063) formerly in Berlin Herbarium clearly shows, of a mixture of the two subspecies of *B. pleistophylla*. One specimen is evidently the type subspecies but the other four specimens are subsp. *leopoldii*. Another collection by Stolz (no. 2364), which is also cited under the original description, consists entirely of subsp. *pleistophylla* so far as I have been able to ascertain. The description appears to have been drawn up from both but primarily from the *leopoldii* specimens. This is also clear from Schlechter's linking of *B. pulchra* with *B. leopoldii* in the key in his revision. The drawing of the flower made by Schlechter,

which was published later by Mansfeld (Fedde, Repert. Beih. **68**), seems, however, to be from a flower on a specimen referable to the type subspecies. A further specimen of the type gathering in the Kew Herbarium is also referable to subsp. *leopoldii*.

27. **Brachycorythis ovata** *Lindl.* Gen. & Sp. Orch. Pl. 363 (1838) ; Bolus, Ic. Orch. Austr.-Afr. **1,** t. 62 (1896) ; Kraenzl. Orch. Gen. et Sp. **1,** 541 (1898) ; Rolfe in Dyer, Fl. Cap. **5,** iii. 85 (1912) ; Schltr. in Beih. Bot. Centralbl. **38,** ii. 115 (1921).

Platanthera ovata (Lindl.) Schltr. in Engl. Bot. Jahrb. **20,** Beibl. l, 12 (1895).

This species, which is the type species of the genus, has a wide distribution in Tropical Africa from Upper Guinea, Uganda and Kenya Colony in the north so far south as the eastern Cape Province. It possesses the characteristic vegetative features of the genus, having numerous lanceolate closely imbricate leaves all up the stem with the bracts very similar, the lower being much longer than the flowers. The species is characterised by the very large boat-shaped hypochile of the labellum, much larger than in *B. pleistophylla* Rchb. f., a trilobed epichile in which the middle lobe may be longer than, equal to or shorter than the more or less reflexed lateral lobes, and obliquely ovate or oblong obtuse petals which are upright on each side of the column.

According to the distribution of the different variations in the characters mentioned above and others the species may be divided conveniently into three subspecies occupying distinct geographical areas.

subspecies **ovata.**

Caulis dense foliatus ; inflorescentia densa ; flores pro rata minores, sepalo intermedio 5–7 mm. longo ; labelli epichilium apice tantum trilobatum, lobo intermedio quam lateralibus saepius longiore.

B. allisonii Rolfe in Dyer, Fl. Cap. **5,** iii. 85 (1912).

Cape Province. Stockenstrom Div., Kat Berg, 600 m. alt., *Hutton* ; Stutterheim Div., Dohne Mt., 1080 m. alt., Jan., *Bolus* ; King Williamstown Div., Perie Forest, Jan., *Sim* 26 ; Transkei, Fort Bowker, *Bowker* 28 ; Tembuland, in grassy places, Jan., *Bolus* ; Pondoland, between Umtata and Umsikaba Rivers, 300–600 m. alt., *Drège* 4569 (type, K).

Of the above I have seen only *Bowker* 28 and *Drège* 4569.

Natal. No locality, *Buchanan* ; *Gerrard* 606 ; 1540 (both K, BM) ; 630 (BM) ; Alexandra Distr., Dumisa, Fairfield, 750 m. alt., Nov. 1911, *Rudatis* 1526 (K, BM) ; same area, Friedenau Farm, near Ellesmere, 600 m. alt., in meadows, Dec. 1908, *Rudatis* 552 (K, BM) ; Inanda, Dec., *Wood* 424 (K, BM) ; same locality, Nov., *Wood* 1169 ; near Pinetown, 240 m. alt., Oct. 1885, *Wood* 540 (BM) ; Attercliffe, 240 m. alt., 1860, *Sanderson* ; Oliviers Hoek, sources of Tugela River, 1200 m. alt., in damp places, *Allison.*

Transvaal. Ermelo Distr., Lichfield near Amsterdam, Dec. 1936, *Van Der Merwe* 1078 (K, PRE) ; Barberton Distr., Saddleback Mts., *Thorncroft* ; Lydenburg Distr., Lydenburg, Mauch Berg, 1755 m. alt., Dec. 1873 Jan. 1874, *Atherstone* ; Lydenburg, 1500 m. alt., Dec. 1893, *Schlechter* 3922 ; Zoutpansberg Distr., Entabeni, Jan. 1941, *Grewcock* (PRE).

Swaziland. Hlalikulu Distr., Dec. 1910, *Stewart* ; Upper Swaziland, mountain sides at 1200 m. alt., Dec. 1889, *Galpin* 725 ; Dalriach, near Mbabane, 1410 m. alt., in grassland, Jan. 1906, *Bolus* 12319 (BR).

This subspecies, which is distributed from the eastern Cape Province to the north of the Transvaal, is on the whole more densely leafy than the other two subspecies and the inflorescence is usually more compact.

The labellum epichile is usually shortly trilobed with a slightly projecting middle lobe but the sinuses between the lobes vary somewhat from one specimen to another, being sometimes hardly developed. *B. allisonii* seems to be merely a rather stunted form with all the parts rather smaller than in other Natal specimens ; it resembles very closely, however, some gatherings from the Transvaal.

subspecies **welwitschii** (*Rchb. f.*) *Summerhayes*, stat. nov.

Caulis subdense foliatus ; inflorescentia laxiuscula ; flores majores, sepalo intermedio 6·5–7·5 mm. longo ; labelli epichilium versus apicem trilobatum, lobo intermedio quam lateralibus minore, lateralibus aequilongo vel breviore (rarius paulo longiore).

B. welwitschii Rchb. f. in Flora, **50,** 99 (1867) ; Rolfe in Dyer, Fl. Trop. Afr. **7,** 202 (1898) ; Kraenzl. Orch. Gen. et Sp. **1,** 539 (1898) ; Schltr. in Beih. Bot. Centralbl. **38,** ii. 119 (1921).

B. acutiloba Rendle in Journ. Linn. Soc. Lond. Bot. **40,** 208 (1911) ; Schltr. in Beih. Bot. Centralbl. **38,** ii. 118 (1921).

Belgian Congo. Sankuru Distr., Sankuru River, Loe. Oct. 1910, *Kassner* 3333 (BM).

Angola. Huilla, Sobato de Humpata, in rather damp meadows, Dec. 1859, *Welwitsch* 707 (type, BM ; K ; Malange, 500 m. alt., in damp places, Nov. 1872, *Mechow* 311 (B, destroyed).

Northern Rhodesia. Mwinilunga Distr., 100 yards NE. of Dobeka Bridge, on sandy plain, not very boggy, Dec. 1937, *Milne-Redhead* 3616 (K, BM ; Mporokoso, Jan. 1944, *Bredo* 5885 (BR ; Abercorn, Mbuga of Lake Chila, under trees at edge, Dec. 1949, *Bullock* 2084 ; same locality, Jan. 1950, *Bullock* 2207 ; same locality, 1620 m. alt., in rough grass, Jan. 1952, *Richards* 261.

Southern Rhodesia. Umtali, Vumba Mts., 1650 m. alt., in vlei, Dec. 1951, *Chase* 4213 (S.R. Gov. Herb. 33760 ; Melsetter Distr., Chirinda Silinda, 1140 m. alt., Dec. 1906, *Swynnerton* 6632 (BM ; same locality, Dec. 1937, *Obermeijer* 2144 (K, PRE).

Subspecies *welwitschii* occupies a central position in the general distribution of the species, namely the savanna region south of the Congo Basin, as far south as the Melsetter area of Southern Rhodesia. It has a less densely leafy stem and laxer inflorescence than the typical subspecies and slightly larger flowers which, on account of the generally smaller bracts, are more easily visible. The epichile is lobed at the apex only, as in subsp. *ovata*, but the lobes are more distinct, usually more or less triangular and pointed, with comparatively narrow sinuses. The middle lobe may rarely be slightly longer than the laterals but is usually shorter and is sometimes considerably shorter. The lateral lobes are normally acute or subacute ; where these are relatively long the epichile approaches in shape that of subsp. *schweinfurthii*.

subspecies **schweinfurthii** (*Rchb. f.*) *Summerhayes*, stat. nov.

Planta elata, 30–100 cm. alta ; caulis dense vel subdense foliatus ; flores majores, sepalo intermedio 5·5–9 mm. longo ; labelli epichilium dimidio apicali distincte trilobatum, lobis lateralibus ± falcatis incurvatis, lobo intermedio saepissime multo minore interdum fere ad dentem redacto.

B. schweinfurthii Rchb. f. Otia Bot. Hamburg. 59 (1878) ; Rolfe in Dyer, Fl. Trop. Afr. **7,** 201 (1898) ; Kraenzl. Orch. Gen. et Sp. **1,** 539

(1898) ; Schltr. in Beih. Bot. Centralbl. **38,** ii. 119 (1921) ; Summerh. in Hutch. & J. M. Dalz. Fl. W. Trop. Afr. **2,** 405 (1936).

B. grandis Kraenzl. in Engl. Bot. Jahrb. **51,** 377 (1914) ; Schltr. in Beih. Bot. Centralbl. **38,** ii. 119 (1921).

B. ugandensis Schltr. in Notizbl. Bot. Gart. Berl.-Dahl. **8,** 223 (1922).

B. grandis, var. *sudanensis* Braid in Kew Bull. **1925,** 359.

B. grandis, var. *ugandensis* Braid, l.c.

B. schweinfurthii, var. *nigerica* Braid, l.c.

Northern Nigeria. Kontagora, June 1911, *Dalziel* 561 ; Abinsi, common in the bush, June and July 1912, *Dalziel* 836 (K, BM) ; Liruwen-Kano Hills, 1921, *Carpenter* ; Bauchi Plateau, in plains, June 1930, *Lely* P384 ; Plateau Prov., Wamba Distr., Lazin Lafia, 1931, *Hepburn* ; same area, Wana, 510 m. alt., June, *Hepburn* 119 ; Nupe, 1906–07, *Yates* (BM) ; near Zungeru & Lokoja, 1907, *Lugard* ; Zungeru, in open bush, June 1905, *Dalziel* ; Zaria Prov., Mando, in *Terminalia* open savanna woodland, July 1950, *Keay* FHI. 25982 ; Zaria Prov., Anara Forest Reserve, Kan-Gimi, in *Terminalia* open woodland, July 1950, *Keay* FHI. 25968 ; as last, near rest-house in *Isoberlinia* open woodland, May 1948, *Keay* FHI. 22882 (Ibadan).

British Cameroons. Bamenda Distr., Lakom, 1800 m. alt., in stony grassland, April 1931, *Maitland* 1787 ; Bali-Ngemba Forest Reserve, hill near Bafawchu Basel Mission School, in open savanna, May 1951, *Ujor* FHI. 30324A.

French Cameroons. Korowal Plateau, Sagdsche, 730 m. alt., in gallery forest by stream, May, *Ledermann* 3870 (B, destroyed ; photo. K) ; Buar, 1000 m. alt., May 1914, *Mildbraed* 9419 ; between Ngaou Ndéré & Meiganga, July 1939, *Jacques-Félix* 4016 (P).

Oubangui-Chari. Yalinga, June 1922, *Le Testu* 3938 (P) ; between Yalinga and Bangassan, May 1921, *Le Testu* 2805 (P).

Belgian Congo. Uele, Monde, near Niangara, in savanna, June 1921, *Claessens* 856 (BR) ; Uele, near Vankerckhovenville, in savanna, April 1906, *Seret* 536 (BR) ; Uele, near Bagbele, Ukwa, 700–800 m. alt., May 1950, *Noirfalise* 376 (K, BR).

A.-E. Sudan. Niam-Niam Country, border area N. of Monbuttu, in depressions in steppe, April 1870, *Schweinfurth* 3577 (type, W) ; Yei R, Lado, Asugi, April, *Sillitoe* 144 ; Dokas, June, *Sillitoe* 143 ; Equatorial Prov., Zande Distr., Li Mbamu, Ch. Gangura, on stream bank in open country, May 1937, *Wyld* 177 (BM).

Uganda. West Nile Prov., Warr, in grassland, April 1940, *Eggeling* 3888 ; Erusi, in grass, April 1940, *Eggeling* 3925 ; Mt. Elgon, 2250 m. alt., in grassland, May 1920, *Lindblom* (S) ; Lwakeka, 1200 m. alt., in short grassland, May 1924, *Snowden* 877 (K, BM) ; Sabei, 1800–2100 m. alt., in short grass, April 1927, *Snowden* 1087 (K, BM) ; same locality, 2100 m. alt., May 1948, *Adamson* 507.

Kenya Colony. Mt. Elgon, May, *Lugard* 661 ; Mt. Elgon, 2010 m. alt., in grass, May 1931, *Tweedie* 8 ; Suam River, 2100 m. alt., in grass, May 1933, *Dale* 3088 ; Kapenguria, N. of Kitale, 2100 m. alt., in long grass and among scrub, May 1932, *Napier* C.M. 1908 ; Cherangani, E. of Kitale, 2120 m. alt., in low grass vegetation with scattered *Acacia*, May 1949, *Maas Geesteranus* 4691 ; Kakamega, 1500 m. alt., in grass, May 1943, *Carroll in Tweedie* 608.

The present subspecies is the northernmost of the three, being found in the savanna belt north of the Congo Forest from Northern Nigeria in the west to the western parts of Kenya Colony in the east. It is on the whole a taller plant than either of the other subspecies, especially in the western parts of its range where it frequently approaches the height of a metre. It usually has an open inflorescence as in subspecies *welwitschii* and even more prominent flowers, due mainly to the greater size of the labellum epichile. From all accounts it must be a handsome plant when fully developed, with its long spike of purple or mauve flowers. The epichile in this subspecies is distinctly trilobed in the upper part with the lateral lobes more or less connivent or incurved and the much smaller middle lobe curved upward to form a sort of projecting tooth continuing the central low keel. The hypochile and column are practically identical with those in the other subspecies, while the other perianth members show much the same ranges of variation.

28. **Brachycorythis kalbreyeri** *Rchb. f.* in Flora, **61,** 77 (1878) ; Rolfe in Dyer, Fl. Trop. Afr. **7,** 201 (1898) ; Kraenzl. Orch. Gen. et Sp. **1,** 540 (1898) ; Schltr. in Beih. Bot. Centralbl. **38,** ii. 120 (1921) ; Summerh. in Hutch. & J. M. Dalz. Fl. W. Trop. Afr. **2,** 405 (1936).

B. kalbreyeri, var. *glandulosa* Braid, in Kew Bull. **1925,** 360 ; Summerh. l.c. (1936).

Sierra Leone. Heddles Farm, June 1915, *Lane-Poole* 376 ; Waia, on tree among ferns, June 1923, *Dawe* 489 ; Makump, 120 m. alt., July 1914, *Thomas* 894 ; Ndijajula, near Njala, May 1927, *Deighton* 700 ; same locality, epiphyte in riverain forest, June 1946, *Deighton* 4315 ; no locality, 1913–14, *Bunting* (BM).

Liberia. St. Paul River, Dobli Ish, on river banks, epiphytic, April 1944, *Bequaert* 173 (AMES).

British Cameroons. Cameroon Mt., Mopanja, 1650–1800 m. alt., dry open spaces among lava rocks, March 1877, *Kalbreyer* 145 (type, W ; BM).

Belgian Congo. Ruwenzori, Lanuri, 1800 m. alt., on fallen tree, May 1914, *Bequaert* 4497 (BR).

Kenya Colony. Sotik Distr., Kipsonoi River, 2040 m. alt., cult. Nairobi, fl. May–June 1954, *Piers* 129 ; Kericho Distr., Saosa River, 1950 m. alt., in deep moss on tree branches, March 1934, *Firth* 20 ; Kericho Distr., Itare, Jan. 1942, *Copley* 53.

One of the most beautiful members of the genus, and unique in its epiphytic habit. In general growth it is reminiscent of several of the Indian species of the genus but in floral structure it agrees very closely with *B. ovata* Lindl. There seems to be no justification for the separation of specimens with hairy stems as a distinct variety.

29. **Brachycorythis basifoliata** *Summerh.* in Kew Bull. **1937,** 457 ; Dandy in Exell, Vasc. Pl. S. Tomé, 313, fig. 21 (1944).

Principe. Pico Papagaio, at or just below summit, 630–660 m. alt., Dec. 1932, *Exell* 680 (type, BM) ; 725 (BM).

Outstanding on account of the long radical leaves and much smaller cauline ones, features which, however, are present but less well developed in *B. paucifolia* Summerh. So far as the labellum hypochile and column are concerned the species is very similar to *B. ovata* Lindl. and *B. kalbreyeri* Rchb. f., but the epichile lacks the well developed side-lobes usually found in these species.

30. **Brachycorythis pilosa** *Summerhayes*, sp. nov.

Herba terrestris, erecta, 25–70 cm. alta. *Tubera* plura, cylindrica vel elongato-ellipsoidea, 2·5–5·5 cm. longa, 1 cm. diametro, dense lanuginosa. *Caulis* rectus vel leviter flexuosus, dense vel subdense foliatus, teres vel ± angulatus, ut folia ± dense velutinus, 2–5 mm. diametro. *Folia* imbricata, adscendentia vel suberecta, inferiora ad vaginas redacta, superiora lanceolata, acuminata, usque ad 2·5–5 cm. longa et 1–1·4 cm. lata, sursum sensim decrescentia, in bracteas abeuntia, ± dense velutina, sicco obscure plurinervia. *Inflorescentia* terminalis, dense multiflora, 10–20 cm. longa, 2–3 cm. diametro ; rhachis cauli similis ; bracteae foliis similes, lanceolatae vel anguste lanceolatae, acuminatae, usque ad 3 cm. longae, inferiores flores superantes, superiores flores aequantes vel superantes, dense velutinae. *Flores* suberecti, cremei vel flavido-albi, labello pallide roseo ; pedicellus cum ovario 10–12 mm. longus, dense velutinus. *Sepalum* intermedium erectum, ellipticum, apice rotundatum, circiter 5·75 mm. longum, convexum, trinervium ; sepala lateralia ± patentia,

oblique ovata vel oblongo-ovata, apice obtusa vel rotundata, 6–6·5 mm. longa, 2·8–3·5 mm. lata, quadrinervia ; omnia sepala extra sparse pubescentia. *Petala* oblique lanceolato- vel ovato-oblonga, apice obtusa, 4·5–5·8 mm. longa, 2–2·5 mm. lata, basi tantum cum columnae adnata, extra glabra, trinervia. *Labellum* in toto 5·5–6 mm. longum, glabrum ; hypochilium ex ore lato in calcar globosum vel ovoideum rotundatum 2·7–3 mm. longum productum, oris marginibus in epichilium breviter decurrentibus ; epichilium deflexum, ambitu obovatum vel orbiculare, 4·5–5 mm. longum, 4·3–5 mm. latum, prope apicem trilobatum, lobis triangularibus vel rotundato-triangularibus subaequalibus vel intermedio quam lateralibus paulo longiore, disco multinervium. *Columna* brevis, 3–3·8 mm. longa, auriculis transverse oblongis; anthera mutica, loculis parallelis, canalibus nullis, viscidiis orbicularibus ; rostelli lobus intermedius parvus, plicatus, ± cucullatus.

Belgian Congo. Lac Léopold II Distr., between Katokokombe and Lodja, in savanna, Sept. 1932, *Lebrun* 6191 (BR) ; Bas Congo, probably near Kisantu, 1902 ?, *Butaye* (BR).

Tanganyika Territory. Ufipa Distr., Chapota, 1650 m. alt., in bracken grassland among rocks, Dec. 1949, *Bullock* 2031 (type, K).

This species is very similar in general appearance to the widespread *B. pubescens* Harv., but differs mainly in the spur-like hypochile of the labellum, this being boat-shaped and not produced downwards at all in the other species. The epichile hangs down as in *B. pubescens* but is relatively longer and narrower than is usual in that species. *B. pilosa* strongly resembles in many respects *B. congoensis* Kraenzl. but that species has glabrous leaves and much narrower petals with emarginate apices.

31. **Brachycorythis pubescens** *Harv.* Thes. Cap. **1,** 35, t. LIV (1859) ; Rolfe in Dyer, Fl. Trop. Afr. **7,** 201 (1898) ; Kraenzl. Orch. Gen. et Sp. **1,** 542 (1898) ; Rolfe in Dyer, Fl. Cap. **5,** iii. 86 (1912) ; Schltr. in Beih. Bot. Centralbl. **38,** ii. 108 (1921).

Peristylus hispidulus Rendle in Journ. Linn. Soc. Lond. Bot. **30,** 398 (1895).

P. hispidulus var. *minor* Rendle, l.c.

Platanthera brachycorythis Schltr. in Engl. Bot. Jahrb. **20,** Beibl. 1, 12 (1895).

Platanthera hispidula (Rendle) Gilg in Engl. Pflanzenw. Ost.-Afr. **C,** 151 (1895).

Brachycorythis goetzeana Kraenzl. in Engl. Bot. Jahrb. **28,** 176 (1900).

B. kassneriana Kraenzl. l.c. **51,** 378 (1914) ; Schltr. in Beih. Bot. Centralbl. **38,** ii. 110 (1921).

B. hispidula (Rendle) Schltr. in Beih. Bot. Centralbl. **38,** ii. 108 (1921).

B. baumii Schltr. l.c. 109 (1921).

B. stolzii Schltr. l.c. 110 (1921) ; Mansf. in Fedde, Repert. Spec. Nov. Beih. **68,** t. 3, no. 12 (1932).

B. sudanica Schltr. l.c. 111 (1921) ; Summerh. in Hutch. & J. M. Dalz. Fl. W. Trop. Afr. **2,** 405 (1936).

French Sudan. Folo, May 1899, *Chevalier* 827 (P).

French Guinea. Sabodougou, near Touba, 675 m. alt., July 1926, *Collenette* 61.

Togo. Near Bismarcksburg, Fasugu, May 1890, *Büttner* 647 (B, destroyed) ; Bassari, 1900, *Thienemann* (B, destroyed).

Northern Nigeria. Bauchi Plateau, May 1930, *Lely* P320 ; June 1930, *Lely* P 333 ; Vom, Bauchi Plateau, 900–1350 m. alt., in open country, *Dent Young* 232 ; Zungeru, July 1911, *Dalziel* 571 ; near Zungeru and Lokoja, *Lugard* ; Naraguta, 1200 m. alt., May 1921, *Lely* 237.

British Cameroons. Bamenda, Lakom, 1800 m. alt., in stony grassland on plateau, April 1931, *Maitland* 1780 ; Jua, 900–1050 m. alt., in grassland, April 1931, *Maitland* 1625.

French Cameroons. Bambuto, 1900 m. alt., in grassland, May 1939, *Jacques-Félix* 5495 (P) ; Dehang, May 1939, *Jacques-Félix* 5223 (K, P).

Gabon. No locality, *Thollon* (P) ; Tchibanga, Nov. 1910, *Le Testu* 1667 (P).

Belgian Congo. Bas Congo, Ngouedi, 25 km. S. of Brazzaville, 800 m. alt., Nov. 1946, *Almkvist* (BR ; Sanda, Nov. 1908, *Vanderyst* (BR) ; Kikvuka, Nov. 1932, *Vanderyst* 36554 BR) ; Sankuru Distr., Kondue, dry places in bush, Nov. 1911, *Gentil* 18 (K, BR) ; same locality, in bush, Nov. 1903, *Laurent* (BR), Sankuru, in bush, Oct. 1914, *Luja* 224 BR) ; Katende, by waterfall, Nov. 1921, *Achten* 604 (BR) ; Sankuru River, Oct. 1910, *Kassner* 3325 (BM) ; between Lusambo and Luluaburg, Aug. 1910, *Kassner* 3297 (BM) ; Kabinda Distr., Kanda-Kanda, in plain, Nov. 1922, *DeGiorgi* 229 (BR) ; Tshitadi, Nov., *Achten* (BR) ; Haut Lomami Distr., Kamina, in marshy grassland, Oct. 1947, *Mullenders* 1430 (K) ; Kapanga, in savanna, Nov. 1932, *Overlaet* 489 (BR), 468 (BR) ; Mushindji, damp places in herb savanna, Nov. 1926, *Kevers* 48 (BR) ; Kivu Distr., Beni, in herb savanna, April 1914, *Bequaert* 3410 (BM) ; Costermansville, Panzi lez Bukaru, in bush, Nov. 1930, *Luja* 27 (BR), 92 (BR) ; Lualaba Distr., Lualaba River, Nov. 1910, *Kassner* 3375 (BM) ; Nieuwdorp, Dec. 1911, *Hock* (BM) ; Katentania, Manika Plateau, in plain, Nov. 1912, *Homblé* 825 (BM) ; Kapanda River, Dec. 1912, *Homblé* 1026 (BR) ; Haut Katanga Distr., Loosi River, Nov. 1910, *Kassner* 3359 (BM) ; ?Tacomintra, on plateau, Nov. 1930, *Quarré* 2233 (BR) ; near Elisabethville, Jan. 1924, *Von Hirschberg* 173 ; Elisabethville, large dambo 2 km. beyond Lubumbashi, Dec. 1924, *Von Hirschberg* 173 (BR) ; between Mukana and Mwanza, Dec. 1938, *Bredo* 2563 (BR).

Urundi. Gisinu, plain between Bigonbi Mt. and Lupungu River, Dec. 1951, *Michel & Reed* 934b (BR) ; S. of Lake Kivu, 1500 m. alt., Dec. 1906, *Wollaston* (BM).

A.-E. Sudan. Equatorial Prov., Jei Distr., Asugi, April 1919, *Sillitoe* 141 ; Ngoi, April 1919, *Sillitoe* 154.

Uganda. West Nile Distr., Koboko, in grassland, May 1938, *Hazel* 498 ; Bunyoro Distr., Budongo Forest, in open grassland, June 1910, *Dawe* 1027 ; Acholi Distr., Gulu, Awach, in swampy grassland, May 1936, *Eggeling* 3027 ; Rom Mt., 1650 m. alt., June 1930, *Liebenburg* 277 ; Karamoja Distr., Kokumongole, 1500 m. alt., in grassland, May 1939, *Thomas* 2891 ; Teso Distr., Sereri, 1080 m. alt., in swampy areas, May 1932, *Chandler* 570 ; Toro Distr., N.W. Ruwenzori, Mahyoro (?), 1950 m. alt., on hillside, Jan. 1936, *Hancock* 116 36 ; S. Ruwenzori, above Bwera, 1200 m. alt., Oct. 1940, *Eggeling* 4101 ; Kichuamba, in grassland, April 1932, *Hazel* 267 ; Kitakwenda, 1200 m. alt., Sept. 1906, *Bagshawe* 1220 (BM) ; Ankole Distr., near Lake Karenga, Nov. 1903, *Bagshawe* (BM) ; Mitoma, Igaia, 1710 m. alt., in short grassland, Oct. 1938, *Purseglove* 430 ; Lwasamaire, 1620 m. alt., on hillsides, Nov. 1935, *Johnston* 1325 ; Kigezi Distr., in herb steppe, Oct. 1914, *Bequaert* 6023 (BR) ; near Lake Chahafi, 1800 2400 m. alt., Dec. 1937, *Sandford* 1 ; Kisolo, 1950 m. alt., in short pastures on rather peaty soil, Oct. 1929, *Snowden* 1613 (K, BM) ; between Nyakabande and Kisolo, 1950 m. alt., on short grassed lava plains, Dec. 1930, *Burtt* 2955 ; Ruhenda, Rugherenbura, 1650 m. alt., in short grassland, Nov. 1946, *Purseglove* 2233 ; Mabunga Camp, foot of Mt. Muhavura, 1800 m, alt., on lava plain, Nov. 1934, *Synge* 1213 (K, BM) ; base of Virunga Mts., in lava plain, 1890 m. alt., in grassland, Nov. 1934, *Taylor* 2193 (BM) ; Masaka Distr., Sango Bay, Mingilo Hill, 1110 m. alt., in grassland, Oct. 1924, *Maitland* 1070 ; Mbale Distr., Sabei, N. of Mt. Elgon, 1800-2100 m. alt., in short grassland, July 1924, *Snowden* 928 (K, BM).

Kenya Colony. Mt. Elgon, 2010 m. alt., in grass, June 1931, *Tweedie* 14 ; Kericho Distr., Kedowa, 2160 m. alt., June-July 1933, *Graham* 3224 ; Londiani, 2280 m. alt., in grasslands, June 1932, *Graham* 2827 ; Londiani, Smith's Farm, 2340 m. alt., *Graham* 2827a ; Nakuru Distr., Nakuru, 1890–1920 m. alt., in grass and bush land, May 1932, *Harger* 7 ; Naivasha Distr., Oleolondo, May-June 1952, *Piers* 94 ; N.E. of Kariandusi, S. of Lake Elmenteita, 1830 m. alt., in woods, May 1893, *Gregory* (BM).

Tanganyika Territory. Bukoba Distr., Kishanda, 1350 m. alt., Dec. 1931, *Haarer* 2369 ; Nsamba, in thicket grass on alluvium, Sept.–Oct. 1935, *Gillman* 547 ; Buha Distr., between Kibondo and Kasulu, on very deep red clay soil, Nov. 1949, *Shabani* ; Tabora Distr., Kakoma, 1140 m. alt., in mbuga, Jan. 1936, *Lloyd* 67 ; Mbulu Distr.,

Rift Valley escarpment between Mbugwe and Mbulu, 1800 m. alt., in short grass savanna, Jan. 1927, *Burtt* 655 ; Mt. Hanang, N.E. slopes, Shesheda, 2250 m. alt., in upland grazed grassland, Feb. 1946, *Greenway* 7632 ; Pienaar's Heights, 1650 m. alt., in *Protea* savanna, Dec. 1929, *Burtt* 2732 ; Iringa Distr., Utshungwe Mts., 1800 m. alt., on grey laterite, Feb. 1899, *Goetze* 634 (B, destroyed ; sketch, K) ; Ufipa Distr., Mbisi, 2250 m. alt., in rocky grassland, Jan. 1950, *Bullock* 2240 ; Mbeya Distr., Aroto Mts., below Mporoto, *Thompson* 697A ; Rungwe Distr., Bomalakitana, in mountain meadows, Jan. 1912, *Stolz* 506 ; Rungwe Mt., Kibila River, 1600 m. alt., in meadows, Dec. 1913, *Stolz* 2382 (K, BM, BR) ; Mwasankulu Forest, 420 m. alt., Jan. 1909, *Stolz* 190 (BM) ; Songea Distr., Matengo, Mbolero, 1100 m. alt., Jan. 1901, *Busse* 911.

Angola. Pungo Andongo, Barrancos de Catete, in rocky damp thickets, Jan. 1857, *Welwitsch* 693 ; Ganda, 2160 m. alt., in swamp, Nov. 1937, *Pittard* 75 (BM) ; Alto Cetumbela, in swampy ground, Nov. 1940, *Faulkner* 445 (PRE, not seen ; K, coloured drawing) ; N.E. of Lunda, near R. Cassai, 750 m. alt., in damp meadow by river, Nov. 1946, *Gossweiler* 13864 (BM) ; Cubango R., Vila da Ponte, Dec. 1905, *Gossweiler* (COI) ; Longa River, Cuito, 1150 m. alt., Dec. 1899, *Baum* 542 (K, COI).

Northern Rhodesia. Mwinilunga Distr., W. end of Kalenda Plain, in grassland, Jan. 1938, *Milne-Redhead* 3915 (K, BM) ; 1928–29. *Marks* 140 ; Nkana. in damp marshy places, Dec. 1936, *Brenan* 1 ; Nkana, Kitwe, in damp marshy places, Jan. 1936, *Brenan* 8 ; Kamibinga Spruit, in swamps, Dec. 1907, *Kassner* 2117 (K, BR) ; Abercorn Distr., Kali Dambo, 1560 m. alt., in damp bog, Jan. 1952, *Richards* 675 ; same locality, 1500 m. alt., in rough grass, Jan. 1952, *Richards* 370 ; Saisi Valley, 1500 m. alt., in vleis on river bank, Jan. 1933, *Gamwell* 147 (BM) ; Lake Chila, in dambo, Jan. 1954, *Nash* 33 (BM) ; same locality, in mbuga, above waterlogging level, Jan. 1950, *Bullock* 2208.

Nyasaland. No locality, 1891, *Buchanan* 512 (K, BM) ; 1895, *Buchanan* 193 (BM) ; Blantyre, Shire Highlands, *Last* ; Mt. Milanje, Dec. 1894, *Scott-Elliot* 8687 (K, BM) ; Shire Highlands, *Adamson* 115 ; Mt. Malosa, 1200–1800 m. alt., Nov.–Dec. 1896, *Whyte* ; Namasi, Zomba, Nov.–Dec. 1899, *Cameron* 82.

Mozambique. Near Lake Nyasa, *Johnson* 1989.

Transvaal. Lydenburg Distr., Lydenburg, 1500 m. alt., Dec. 1893, *Schlechter* 3926 ; same locality, Oct. 1894, *Wilms* 1378 (BM) ; Pilgrims' Rest, 1879, *Greenstock* (BM) ; Barberton Distr., Barberton, 1890, *Culver* 15 ; Saddleback Mts., S. of Barberton, *Thorncroft* ; Middelburg Distr., Middelburg, Dec. 1893, *Kassner* 459 (BR) ; Johannesburg, in open veldt to north, Dec. 1902, *Rand* 1098 (BM) ; " Diamond Fields ", *Tuck* 1.

Natal. No locality, *Buchanan* ; 1862, *Cooper* ; *Gerrard* 719 ; near Durban, *Sanderson* 178 ; 1860, *Sanderson* 482 (type, Trinity College, Dublin, not seen ; K) ; same locality, *Gerrard & McKen* ; Dargle Farm, *Fannin* 80 ; Inanda, 540 m. alt., on grassy slopes, Nov. 1880, *Wood* 375 (BM) ; Nov. 1881, *Wood* 1659 ; Zululand, *Gerrard* 630 (BM).

The present species has a more extensive distribution than any other African species of *Brachycorythis*, occurring in the greater part of Tropical Africa and extending southwards into the Transvaal and Natal. As might be expected from such a widely distributed plant it exhibits a great range of variation but I have been unable to correlate these variations with the geographical distribution and consequently cannot recognise any sub-species.

Many of the variants have been described as distinct species and Schlechter in his revision of the genus recognised six species within the limits of the present concept of *C. pubescens*. Examination of well over 100 gatherings of the group has convinced me, however, that none of the characters used by Schlechter (relative sizes of middle and lateral labellum lobes, relative breadth of epichile, hairiness or glabrousness of petals, ciliation of middle labellum lobe, size of flowers) is of any diagnostic value and various combinations of them can often be found in different flowers on the same plant.

Apart from this variation in the floral characters there is also considerable variation in the leafiness of the stem, the shape and size of the leaves and the degree of hairiness. Sometimes the hairs are so close as to form a velvety covering but in other plants they are much sparser though always easily visible.

32. **Brachycorythis velutina** *Schltr.* in Engl. Bot. Jahrb. **53,** 483 (1915), et in Beih. Bot. Centralbl. **38,** ii. 107 (1921) ; Mansf. in Fedde, Repert. Spec. Nov. Beih. **68,** t. 4, no. 13 (1932).

Tanganyika Territory. Kymbila Distr., Bomalakitana, 1000 m. alt., in mountain meadows, Dec. 1911, *Stolz* 1053 (type, B, destroyed, photo. K ; K, BM).

Southern Rhodesia. Salisbury Distr., Highlands, 1470 m. alt., in open woodland and grassland, Nov. 1948, *Greatrex* S.R. Gov. Herb. 22007 ; Salisbury, late Dec. 1897, *Rand* 266 (BM) ; Marandellas and Sabi Distr., Dec. 1931, *Myres* 108.

33. **Brachycorythis mixta** *Summerhayes*, sp. nov.

Herba terrestris, erecta, 30–35 cm. alta ; tubera non visa. *Caulis* rectus, subdense foliatus, inferne 5–7 mm. diametro, verosimiliter teres, ut folia ± dense velutinus. *Folia* infima ad vaginas redacta, ovata, apiculata, glabrescentia ; superiora imbricata, lanceolata vel late lanceolata, acuminata, usque ad 4·5 cm. longa et 1·8 cm. lata, sursum decrescentia in bracteas abeuntia, dense velutina, siccitate brunnea, subtus pluricostata. *Inflorescentia* dense multiflora, 7–10 cm. longa, 3·5–4 cm. diametro ; bracteae foliis similes, lanceolatae, acuminatae, flores aequantes vel superantes, dense velutinae. *Flores* patentes, flavi, labello brunneo-striato ; pedicellus cum ovario leviter arcuatus, circiter 1·3 cm. longus, dense velutinus. *Sepalum* intermedium erectum, anguste obovatum, apice ± rotundatum, 7 mm. longum, circiter 3·75 mm. latum, convexum ; sepala lateralia ± patentia, oblique late ovatum, apice rotundatum, fere 7 mm. longum, 4·5 mm. latum ; omnia sepala quinquenervia, extra pubescentia vel sparse velutina. *Petala* erecta, oblique oblonga, apice truncato-rotundata, 3–4-nervia, glabra, basi cum columnae adnata. *Labellum* porrectum, in toto 9 mm. longum ; hypochilium breviter saccatum, rotundatum, oris marginibus in epichilium breviter decurrentibus ; epichilium triangulari-obovatum, lateribus valde reflexis, subcarnosum, circiter 7·5 mm. longum et latum, apice trilobatum, lobis lateralibus ± conniventibus acutis, lobo intermedio quam lateralibus breviore incurvato. *Columna* erecta, pro rata gracilis, circiter 4 mm. alta, auriculis orbicularibus ; anthera mutica, loculis parallelis, canalibus nullis, viscidiis orbicularibus.

Angola. Huambo Mission, E. of Benguela, in savanna near wheat-field, Sept. 1942 *Tisserant* A177 (type COI).

This species, though agreeing with *B. pubescens* Harv. and *B. velutina* Schltr. as regards the general vegetative characters, has flowers which more closely resemble those of *B. ovata* Lindl. especially the subspecies *welwitschii*. The epichile of the labellum is in almost all respects similar to that organ in *B. ovata* and its allies, the sides being strongly reflexed and the central lobe, which here is shorter than the laterals, being upturned exactly as in the two northern subspecies of *B. ovata*. In *B. pubescens*, on the other hand, the labellum epichile hangs down, usually forming an angle with the hypochile, and all the lobes are in the same plane.

It is possible, of course, that the two plants in the type gathering are hybrids between *B. pubescens* and *B. ovata* subsp. *welwitschii*, but although both species occur in Angola neither has been found so far at the Huambo Mission though Father Tisserant has collected several other species of *Brachycorythis* from that locality. The two specimens agree very closely in all essential features and do not have the appearance of being part of a hybrid swarm.

Species excludendae

Brachycorythis junodiana Kraenzl. in Vierteljahrsschr. Nat. Ges. Zürich, **60,** 389 (1915).

This is evidently a species of *Neobolusia* but as I have not seen the type I am not attempting to place it specifically.

B. lastii Rolfe in Dyer, Fl. Trop. Afr. **7,** 203 (1898).
= **Schwartzkopffia lastii** (Rolfe) Schltr.

B. pumilio (Lindl.) Rchb. f. in Flora, **65,** 531 (1882).
= **S. pumilio** (*Lindl.*) *Schltr.*

B. rosea A. Chev. Expl. Bot. Afr. Occ. Franç. **1,** 621 (1920), nomen.
= **S. pumilio** (*Lindl.*) *Schltr.*

B. tysoni Bolus in Journ. Linn. Soc. Lond. Bot. **20,** 485 (1884).
= **Neobolusia tysoni** (*Bolus*) *Schltr.*

B. virginea (Bolus) Rolfe in Dyer, Fl. Cap. **5,** iii. 87 (1912).
= **N. virginea** (*Bolus*) *Schltr.*

George Joseph Kamel, S.J. (**1661-1706**)*.—This important pre-Linnaean figure in Philippine botany was a Jesuit priest and a pharmacist from Brno who went to Manila at the age of 26 and, besides setting up an important pharmaceutical practice there, he developed a great interest in the plants and animals of the Philippines. He sent specimens, descriptions and drawings of his plants to Ray and Petiver in England. Many of Kamel's descriptions appear as an appendix to Ray's *Historia Plantarum*. The genus *Camellia* L. was so named by Linnaeus to commemorate Kamel.

The first comprehensive account of the life and work of Kamel has been prepared by J. and R. Gicklhorn. Extracts from letters and documents as well as photographs of Kamel's handwriting and original drawings of plants and animals are included. The authors include a short chapter enumerating the errors concerning Kamel which have appeared in the literature. An error which the authors themselves make is to attribute to *Flora Malesiana Cyclopedia* the suggestion that *Camellia* L. commemorates a collector called Camel in North America. (This erroneous suggestion probably originates from Poiret in Lamarck's *Encyl. Méth. Bot.* **8,** 749, where it is stated that *Camellia* L. commemorates ' Camelli ' who ' collected in America '.) An extensive bibliography is appended.

L. L. Forman.

* George Joseph Kamel, S.J. (1661–1706), Apotheker, Botaniker, Arzt und Naturforscher der Philippineninseln, by Joseph and Renée Gicklhorn (Veröffentl. Intern. Ges. Gesch. Pharm. N.F. Bd. 4) Eutin (Holstein) : Intern. Ges. Gesch. Pharm. 1954 ; pp. 123 + 14 plates.

NOTES ON AFRICAN ASCLEPIADACEAE*.—VI.

This contribution contains a revision and critical notes on the genus *Leptadenia* R. Br. The distribution of the genus, with one species in India which extends to the Mascarene Islands and three in Africa, two of which extend into Arabia and one of these as far east as Sind, is of some interest. It compares with the distribution of *Pentatropis* Wight et Arn. with two species, one in Africa extending to the Mascarene Islands and through the Orient to Pakistan and northwestern India, the other confined to peninsular India and Ceylon. Both genera occupy arid or semi-arid country. Such distributions contrast sharply with that of *Cryptolepis* R. Br. a genus of a few species widely distributed in forest areas of tropical Asia and Africa but apparently absent from the Mascarene Islands, and with that of *Ectadiopsis* Benth., a genus of savannah woodland plants confined to Africa. I have considered this last genus in considerable detail and the appropriate species of all of them are included. I have added a few further notes and new records in the genera *Strobopetalum* N. E. Br. an Arabian plant now known to occur in British Somaliland, *Cynanchum* Linn., *Diplostigma* K. Schum. and *Marsdenia* R.Br.

As usual, the cited specimens are, unless otherwise stated, at Kew.

I am very grateful to Prof. Pichi-Sermolli of Florence for the opportunity to examine type and other material of species of *Pentatropis* ; these specimens are cited with " (F) " following the collectors' numbers. Thanks are due also to Dr. Hagerup of Copenhagen, for the loan of the type specimen of *Leptadenia arborea* (Forssk.) Schweinf., to Dr. Taylor and his staff at the British Museum for ever ready permission to work freely in the herbarium of the Botany Department, and to Prof. Humbert of Paris for the loan of Madagascar specimens of *Leptadenia*.

There is no doubt of the affinity of the *Asclepiadaceae* with the *Apocynaceae* and it will be recalled that Hutchinson (1926) placed them together in his order *Apocynales*. In his linear sequence†, the *Apocynales* were placed immediately before the *Rubiales* (*Rubiaceae* and *Caprifoliaceae*) and after the *Loganiales* (*Loganiaceae* and *Oleaceae*). The argument for alliance with the *Rubiaceae* is further strengthened by R. E. Woodson's (1930) work on floral ontogeny in the *Apocynaceae*, in which he demonstrates derivation from an inferior ovary. The alliance with the *Loganiaceae* depends partly on the inclusion in that very heterogeneous and artificial family of the genus *Strychnos* Linn., which would be better placed in the *Apocynaceae* or in a separate family. On similar grounds the separation of the subtribe *Fagraeeae* (*Potalieae*) of the *Loganiaceae* as a separate family and the transference of the tribe *Gaertnereae* to *Rubiaceae* is to be recommended. Attention is drawn also to the close alliance of *Gentianaceae* to all these families and the possibility that all of them are derived from a saxifragaceous stock.

References

Hutchinson, J. 1926. Families of Flowering Plants. Dicotyledons.

Woodson, R. E. 1930. Studies in the Apocynaceae, I. Ann. Missouri Bot. Gard. **17,** 1–212.

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* Continued from Kew Bull. **1954,** 594 (1955).

† Dr. Hutchinson did not postulate a linear descent of one recent family from another ! —A.A.B.

SOCOTORA *Balf. f.*

Balfour (1888) placed this genus in the tribe *Echitoideae* of the *Apocynaceae*, having completely misunderstood the flower structure. In his dissection, the typically periplocoid pollen-carriers remained attached to the style and he regarded them as stylar appendages. He recognised, however, that the gynoecium was more like that of the *Asclepiadaceae* than of the *Apocynaceae*.

Balfour's plant, as shown in the synonymy given below, has been regarded as a species of *Periploca* but I prefer to retain it as a distinct genus, differing from *Periploca* in habit,—it is a completely aphyllous switch-plant,—and in the presence on the greenish corolla-lobes of large red gland-patches exuding copiously a viscid liquid. The corolla-lobes of *Periploca* are not glandular and are usually softly villous on the inner face. Both Vatke (1876) and Deflers (1889), referred the only species to *Leptadenia* R. Br., a genus of *Asclepiadoideae*.

Socotora visciformis (*Vatke*) *Bullock*, comb. nov.

Leptadenia visciformis Vatke in Oesterr. Bot. Zeitschr. **26,** 146 (1876) ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 257 (1902), in obs., sp. dub., et *l.c.* 433 (1903).

Socotora aphylla Balf. f. in Proc. Roy. Soc. Edinburgh, **12,** 77 (1883), et Bot. Socotra in Trans. Roy. Soc. Edinburgh, **31,** 159, t. 46 (1888) ; Engl. Veg. der Erde, **9,** Pflanzenw. Afr. **1,** 206, f. 179 (1910) ; Chiov. Fl. Somala, **1,** 217 (1929) ; non *Periploca aphylla* Decne.

Leptadenia ephedriformis Defl. Voy. Yemen, 166 (1889).

Periploca visciformis (Vatke) K. Schum. in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 216 (1895) ; Schwartz, Fl. Trop. Arab. in Mitt. Inst. Bot. Hamburg, Festschr. Winkler, **10,** 187 (1939).

P. ephedriformis (Defl.) Schweinf. ex Defl. Asclep. Arab. Trop. in Mém. Inst. Egypt. **3** (2), 256 (1896) ; Hutch. et Bruce in Kew Bull. **1941,** 144 (1941).

There is no Arabian material of this species at Kew ; the *locus classicus* is in British Somaliland, where it was collected by *Hildebrandt* (no. 1432) in April 1875, in the Al hills ; it was also found by *Collenette* (no. 331) in 1929, in the same area.

The following vernacular names have been obtained in British Somaliland :—AAN ORLE (Esa and Gudabersi tribes ; *Gillett, Glover and Gilliland*) ; GESA RIOLI (Ishaak tribes ; *Gillett, Glover and Gilliland*). The first of these indicates " milk foam " in reference to the copious latex, the second " goat's horn " in reference to the paired divaricate follicles. The plant is an important fodder in some places and camels grazed upon it can go for long periods without water (*Gillett*).

The material listed below is at Kew :—

SOCOTRA. Feb.–March 1880 (fl.), *Bayley-Balfour* 327.

BRITISH SOMALILAND. Golis Range, about 6000 ft. ; Dec. 1909 (fl.), *Drake-Brockman* 539, 540. Denan, Al hills, 3750 ft., 10° 55′ N., 48° 55′ E., in crack on steep rock face [also common at Sugli and fairly common at Shimba Beris] ; " plant 8 ft., flower light-green, stamens white ; white latex in stems ; common, but rarely in flower " ; Nov. 1929 (fl.), *Collenette* 331. Kahih Bahr, 2500–3000 ft., on limestone slopes at the lower fringe of tree *Acacia*, 10° 20′ N., 43° 44′ E. [also on limestone rocks at 10° 5′ N., 43°

16′ E., and at the summit of Mt. Wooleh, 5900 ft.] ; " shrub up to 3 m., with milky juice ; the thickest stem seen was 10 cm. in diameter ; flowers yellowish " ; Nov. 1932 (fl., young fr.), *Gillett* 4548. Erigavo district, 5000–6000 ft., on hillsides ; Jan. 1939 (sterile), *McKinnon* S.237. Surudi, Gan Libah ; Jan. 1945 (fl., fr.), *Glover and Gilliland* 660. Gan Libah, 5000 ft., " woody shrub up to 18 ins. " ; July 1945 (fl., fr.), *Glover and Gilliland* 1209. Gan Libah, 4000 ft. ; " small shrub, flowers pale yellow " ; June 1949 (fl.), *Bally* 7311. Abassa headwaters, above 6000 ft., on top of limestone hills ; Aug. 1953 (sterile), *White* 188 ; Hill at Dunkasia, 22 mls. north-west of Borama, 5800 ft., on rocks ; " shrub with cream flowers ; latex " ; Oct. 1954 (fl.), *Bally* 9985.

Ethiopia. Yuka, Harar, on limestone slopes, 5600 ft., 9° 27′ N., 41° 40′ E. ; " evergreen shrub, 1 m., with milky latex, flowers yellowish-green " ; March 1933 (fl., young fr.), *Gillett* 5456.

Petopentia *Bullock*

Petopentia natalensis (*Schltr.*) *Bullock* in Kew Bull. **1954,** 362 (1954).

A more recent collection of this plant has been presented to Kew by Dr. R. A. Dyer, Chief of the Division of Botany, Pretoria, and there is a *Rudatis* specimen at Kew which I omitted from my previous enumeration.

Natal. Dumisa, Alexandra, 1650 ft. ; Oct. 1911, *Rudatis* 1466. Imfuli Valley, N.E. of Melmoth, Zululand, about 2000 ft. ; " climbing over *Gelonium*, etc., leaves dark glossy green. flowers dull yellow " ; Oct. 1946 (fl.), *Acocks* 13000.

Ectadiopsis *Benth.*

The separation of this genus from *Cryptolepis* R. Br., with which N. E. Brown united it, is not easy if floral characters alone are taken into account. Also, the taxonomic position has been confused by an unwarranted multiplication of names for forms which represent mere variations of a single species. The new synonymy of *E. oblongifolia* (Meisn.) Schltr. given below includes no fewer than twenty-five specific names ; these include ten of the species of *Cryptolepis* described by Brown in the *Flora of Tropical Africa*, together with a few others which have either been described since the *Flora* was published or which Brown was unable to place satisfactorily. Some of these were examined by my colleague Miss E. A. Bruce in 1946 ; she concluded that all the specimens from West Africa, the northern savannahs, East Africa, Nyasaland and southwards to the Transvaal, Natal and Cape Province (Griqualand East) represented a single species. She did not include the material from Northern Rhodesia, southern Belgian Congo and Angola, which I have now included.

In my discussion, I have considered at some length the characters on which various authors have depended for the delimitation of species, and have attempted to show that these are of little value ; my own maintenance of *Ectadiopsis producta* (N. E. Br.) Bullock depends upon a postulate which seems reasonable and suggests an experimental approach to this problem.

As is usual at the generic level, the separation of *Ectadiopsis* from *Cryptolepis* (and now also *Mangenotia* Pichon) is a matter of convenience and opinion. *Ectadiopsis* is confined to Africa and includes erect woody or semi-scandent plants whose stems may become flexuose or twining, but they are not obligate climbers ; their leaves are somewhat coriaceous and tend to grow at an acute angle to the stem ; they are inhabitants of open savannah country and subject to annual or at least occasional burning. *Cryptolepis* is much more widely distributed through the Old

World and all its species are obligate twining climbers with usually thin mesophytic patent leaves and semi-herbaceous or softly woody stems. They are inhabitants of moister forest country but some species, such as *C. cryptolepioides* (Schltr.) Bullock, have acquired harder stems and more coriaceous leaves and are able to grow in drier habitats.

In regard to floral structure there are few if any differences which can be written down convincingly : in general the flowers of *Cryptolepis* are larger and in the bud stage the corolla lobes are so twisted as to form a long acuminate tip which may be swollen at its extremity ; those of *Ectadiopsis* are of more leathery texture and the buds are either acute or almost obtuse, but never long acuminate or swollen at the tip. The inflorescence of *Ectadiopsis* is also smaller and more compact than in *Cryptolepis*.

Perhaps the most easily observed difference between the two genera is in the position of the mature follicles ; in *Ectadiopsis* they are ascending and form an acute-angled **V** ; in *Cryptolepis* they are horizontally opposed or even somewhat reflexed or recurved.

Ectadiopsis oblongifolia (*Meisn.*) *Schltr.* in Engl. Bot. Jahrb. **18,** Beibl. No. 45, 14 (1894), et *l.c.* **20,** Beibl. No. 51, 10 (1895) ; K. Schum. in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 219 (1895) ; Wood, Handb. Fl. Natal, 84 (1907).

Ectadium ? *oblongifolium* Meisn. in Hook. Lond. Journ. Bot. **2,** 542 (1843) ; Hochst. in Flora, **27,** 827 (1844) ; Walp. Rep. **6,** 481 (1847).

Secamone acutifolia Sond. in Linnaea, **23,** 76 (1850) ; Walp. Ann. **3,** 48 (1852).

Ectadiopsis nigritana Benth. in Hook. Ic. Pl. **12,** 75, t. 1187 (1876) ; K. Schum. *l.c.*

E. welwitschii Baill. in Bull. Soc. Linn. Paris, **2,** 802 (1889) ; Britten in Trans. Linn. Soc. Ser. 2, Bot. **4,** 26 (1894) ; K. Schum. in Engl. Pflanzenw. Ost Afr. **C,** 320 (1895), et in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 219 (1895).

E. lanceolata Baill. *l.c.* 803 ; K Schum. in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 219 (1895).

E. myrtifolia Baill. *l.c.* ; K. Schum. *l.c.*

Cryptolepis brazzaei Baill. *l.c.* ; Hiern in Cat. Afr. Pl. Welw. **1,** 678 (1898) ; Henriques in Bol. Soc. Brot. **16,** 67 (1900) ; N E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 248 (1902).

C. sizenandi Rolfe in Bol. Soc. Brot. **11,** 86 (1893)*.

C. myrtifolia (Baill.) Schltr. in Journ. Bot. **33,** 301 (1895) ; Hiern, *l.c.* 677.

C. welwitschii (Baill.) Schltr. *l.c.* ; Hiern, *l.c.* ; N. E. Br. *l.c.*, et *l.c.* 614 (1904) ; Norman in Journ. Bot. **67,** Suppl. 2, 91 (1929).

C. elliotii Schltr. *l.c.* 300 ; N. E. Br. *l.c.* 250.

Ectadiopsis scandens K. Schum. *l.c.* ; N. E. Br. *l.c.* 249, in obs. ; De Wild. in Ann. Mus. Congo, Sér. 4, Bot. **1,** 108 (1903) ; Dur. Syll. Fl. Congol. 356 (1909).

* The date of publication is doubtful. See Britten in Journ. Bot. **33,** 77 (1895).

E. buettneri K. Schum. *l.c.* ; N. E. Br. *l.c.* 252, sub spp. imperf. connatae; Dur. *l.c.*

E. acutifolia (Sond.) K. Schum. *l.c.*

E. nigritana var. *congesta* K. Schum. in Engl. Bot. Jahrb. **23,** 232 (1896).

Cryptolepis oblongifolia (Meisn.) Schltr. *l.c.* **34,** 315 (1896) ; N. E. Br. *l.c.* 249, et in Thiselton-Dyer, Fl. Cap. **4** (1), 529 (1907) ; Eyles in Trans. Roy. Soc. S. Afr. **5,** 446 (1916) ; Bruce in Kew Bull. **1946,** 48 (1946) ; Robyns, Fl. Sperm. Parc Nat. Albert, **2,** 86 (1947) ; Lebrun, Taton et Toussaint, Contr. Étud. Fl. Parc Nat. Kagera, 107 (1948) ; Brenan, Trees Shrubs Tanganyika Terr. (2), 64 (1949) ; Andrews, Fl. Pl. Anglo-Egypt. Sudan, **2,** 406 (1952) ; Monod in Mém. Inst. Franç. Afr. Noire, No. 18, 14 (1952).

C. welwitschii var. *luteola* Hiern, l.c. ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 249 (1902).

C. angolensis Welw. ex Hiern, *l.c.* ; N. E. Br. *l.c.* ; Norman, *l.c.*

C. scandens (K. Schum.) Schltr. West-Afr. Kautschuk-Exped. 308 (1900), et in Warb. Kunene-Sambesi-Exped. Baum, 340 (1903) ; N. E. Br. *l.c.* 249, in obs.

Ectadiopsis suffruticosa K. Schum. in Engl. Bot. Jahrb. **28,** 453 (1900) ; Brenan, *l.c.* 65, in syn.

Cryptolepis nigritana (Benth.) N. E. Br. *l.c.* 251 ; Mildbr. Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped. 1907–8, **2,** 542 (1913) ; Hutch. et J. M. Dalz. Fl. W. Trop. Afr. **2,** 53 (1931) ; Robyns, *l.c.*

C. hensii N. E. Br. *l.c.* 246 ; De Wild. in Ann. Mus. Congo, Sér. 5, Bot. **1,** 180 (1904), et in Bull. Jard. Bot. Brux. **7,** 26 (1920) ; Dur. *l.c.* 355.

C. baumii N. E. Br. *l.c.* 247, et *l.c.* 614 (1904) ; De Wild. in Ann. Mus. Congo, Ser. 5, Bot. **1,** 180 (1904) ; non Schltr. (1903).

C. suffruticosa (K. Schum.) N. E. Br. *l.c.* 251 ; Brenan, *l.c.* 64.

C. debeerstii De Wild. *l.c.* ; Dur. *l.c.*

C. linearis N. E. Br. in Kew Bull. **1908,** 408 (1908).

C. buxifolia Chiov. Racc. Bot. Miss. Consol. Kenya, 80 (1935).

The taxa here united include the " species " numbered 7 and 9 to 16 in N. E. Brown's key and enumeration in the *Flora of Tropical Africa* (1902), together with one which he regarded as imperfectly known (*Ectadiopsis buettneri* K. Schum.) and another which he somewhat tentatively reduced (*E. scandens* K. Schum.) ; I have also included *Cryptolepis debeerstii* De Wild., which was published just after the appearance of the *Flora*, together with *C. linearis* N. E. Br. and *C. buxifolia* Chiov.

Brown registed a number of disagreements with published identifications by other authors, including a number of reductions of Baillon's species based on specimens collected by Welwitsch. Of Schumann's *Ectadiopsis buettneri*, he stated that the description " . . . . . applies equally to at least three species ", whilst in a number of places he added notes to his descriptions intended to bolster up the somewhat weak distinctions between species noted in his key.

All these facts induce doubt as to the status of the " species " defined in the *Flora* and in 1946 my colleague Miss E. A. Bruce undertook an

intensive study of the material referred to *Cryptolepis oblongifolia*, *C. elliotii* and *C. nigritana* which resulted in the union of these three "species". She also produced a distribution map showing that the plant occurred throughout the northern and eastern savannah belt, from Senegal to Kenya and southwards through Tanganyika, eastern Southern Rhodesia, Nyasaland and Mozambique to Natal and Griqualand East. The map showed a remarkable absence of the plant from the floristically similar areas of Northern Rhodesia, southern Belgian Congo and Angola, the area from which all the remaining " species " were described, except *Ectadiopsis suffruticosa* which came from southern Tanganyika.

I have indicated in Table I the measurements given by Brown in his *Flora* descriptions, transcribing his lines and inches into the metric scale ; those for *Ectadiopsis suffruticosa* (which Brown did not see) and *Cryptolepis debeerstii* are taken from the original descriptions. The last column gives the number of specimens upon which the descriptions were based, and Table II gives the territory in which they were collected. Brown's description of *Cryptolepis oblongifolia* in the *Flora Capensis* (1907) has been included, and in Table II I have given the areas from which I have seen material.

The " key " characters used by Brown are, as indicated above, somewhat weak, but it is necessary to examine them in some detail in conjunction with the material now available in order to establish their unreliability. " Cymes obconic, flat-topped " against " Cymes dense, rounded or subglobose " merely serves to separate specimens with mature inflorescences from those in a younger state ; specimens of intermediate age will be placed in one or the other according to the fancy of the observer. Leaf-shape and proportions are twice used : " leaves linear " against " leaves lanceolate or oblong-lanceolate " and " leaves lanceolate to elliptic oblong, 2–5 times as long as broad " against " leaves linear or linear-oblanceolate, 4½–12 times as long as broad " are clearly difficult to apply and the more abundant material now available shows that the implied differences are illusory. The length to breadth ratio is a continuous variable, but the extremes of breadth are rare ; leaves apparently as much as twelve times as long as broad have dried with recurved edges and this was not taken into account by Brown. The only other reference to the leaves is to separate *C. welwitschii* with "leaves 3-nerved at the base", from *C. angolense* with " leaves not 3-nerved at the base ". None of the specimens has three-nerved leaves such as those commonly found in species of *Strychnos* or in the *Melastomaceae* ; some of them, however, show a well-marked marginal loop-vein which may be obscured if the margins are recurved or if the leaves are old and tough in texture. The character is thoroughly unreliable.

The remaining characters refer to parts of the corolla and Brown primarily used " corolla pubescent within at the base of the lobes and in the throat of the tube " against " corolla glabrous within ". I have dissected a large number of flowers, and have concluded that the hairs referred to (always few in number) fall off so easily that their presence or absence in dried specimens is without significance. In the living state also it is doubtful whether any flowers are completely hairless around the throat of the corolla, and the actual density of the hairs is variable within

comparatively narrow limits. The shape of the " sinus-pockets " between the corolla lobes is used in the key to separate *C. welwitschii* (" sinus prockets truncate ") from *C. angolense* (" sinus-pockets produced into long filiform processes "), and the character is regularly described in the descriptions. Only *C. producta* (see below, p. 000) is said to have sinus-pockets like those of *C. angolense*, the remainder being described as truncate or produced into a short tooth, or, in *C. suffruticosa*, as "variable, truncate, emarginate or subulate ". This again is in fact a continuous variable and quite useless for the delimitation of taxa. Other corolla characters, such as " corolla acute or acuminate in bud " against "corolla. obtuse in bud " and the absolute width of the oblong lobes (from 1–2 mm.) are dependent on the age of the flower and it is not unusual to find two or three " species ", delimited by these characters, on the same specimen.

The number of flowers in a cyme is notoriously variable according to a number of external factors such as nutrition, exposure and season, as well as being dependent upon vigour, position on the plant and other factors. Brown separated *C. suffruticosa* with " flowers solitary or in 2-flowered cymes " from two other groups of species with " flowers 3–16 in a cyme " and " flowers 20 or more in a cyme ". The character is clearly unsatisfactory and certainly cannot be applied reasonably to the mass of material I have seen, in which the number of flowers in a cyme shows continuous variability beyond the various ranges given by Brown in specimens of the same collection.

The shape of the coronal lobes is always mentioned in Brown's descriptions ; they may be " subulate ", " subclavate ", " subrhomboid, subterete or clavate ", " fusiform-clavate ", " oblong-spathulate " or " clavate ",—again a continuously variable series, to which I would add that coronal lobes which are more or less subulate rather than clavate are found in old flowers and have begun to wither. The size-variation given by Brown (it is not always mentioned) is from ¼ to 1 line in length. My own observations, on mature coronal lobes which are not ageing, give a continuous variation from slightly less than 1 mm. to less than 2 mm.

The length of the corolla-tube varies, according to Brown, from 1 mm. in some flowers of *C. angolensis* to 2·5 mm. in some flowers of *C. nigritana*. My dissections give a narrower range of variation ; the tube is rarely less than 1·5 mm. long and I have not found one exceeding about 2·25 mm. Similarly the corolla lobes vary in length from a little more than 2 mm. to slightly less than 4 mm., but these extremes are rare and the great majority of flowers examined in the course of this work had lobes round about 3 mm. long.

The form of the inflorescence, as well as the number of flowers it bears, is used by Brown. " Cymes dense, rounded or subglobose ", against " cymes obconic, flat topped " serves to separate *C. brazzaei* from *C. hensii* and *C. baumii*, whilst " . . . . . rather congested " against " . . . . . not congested " is a minor character in the separation of *C. welwitschii* and *C. angolensis* from *C. oblongifolia*, *C. elliotii* and *C. nigritana*. Needless to say, extreme specimens can be separated easily by the use of such vague characters, but I have been unable to find any inflorescence character by means of which specific segregation of the herbarium material could be undertaken.

Table I. Analysis of diagnostic characters

Name and number in Fl. Trop. Afr.	Habit	Petiole (mm.)	Leaf lamina (mm.)	Bracts (mm.)
7. *C. hensii*	twining	1·6–2	37–62 × 3–7	0·7–1, ovate
9. *C. baumii*	flexuose or twining	2–4	25–44 × 10·6 – 14·8	0·7–1, ovate, acute
10. *C. brazzaei*	twining	2–5	37–62 × 6–25	1, ovate, acute
11. *C. welwitschii*	erect or scrambling	1–2	19–50 × 3–21	minute
12. *C. angolensis*	erect (or scrambling)	2–4	25–50 × 6–12·7	minute, rounded
13. *C. oblongifolia*	erect	1–2·6	12·5–50 × 6–17	1–2, ovate, obtuse
14. *C. elliotii*	erect	1–2	12·5–25 × 6·3–12·7	—
15. *C. nigritana*	erect, virgate	1–2	37–88 × 3–12·5	2, ovate-lanceolate, acute
— *C. debeerstii*	erect	2	20–35 × 9–17	1
16. *C. suffruticosa*	erect	0	20–65 × 1·5–10	subulate
8. *C. producta*	? scrambling	1–2	12·5–33 × 8–17	minute, ovate, acute

used in Flora of Tropical Africa.

licel m.)	Sepals (mm.)	Corolla-tube (mm.)	Corolla-lobes (mm.)	Sinus-pockets	Corona-lobes	No. of specimens
4	1, oblong, obtuse	1·6	2 × 1, oblong, obtuse, oblique	truncate, ciliate	subulate, obtuse, incurved	1
3·6	1·6 × 1, oblong-ovate, obtuse	1·6	2·6–2·8, oblong, obtuse	ciliate	0·7–1 mm., subulate, acute, incurved	1
4	1–1·6, ovate, obtuse	2	2 × 1·4–1·6, oblong, obtuse	ciliate	1 mm., subulate, obtuse or acute, incurved	3
4	1·6, ovate, obtuse	2	2·6 × 1·6–2, oblong, obtuse	truncate, not ciliate	1 mm., subclavate, obtuse or subacute	3
3·6	1·6–2, oblong, obtuse	1–1·4	3–3·5 × 1·4, oblong, obtuse	produced to 1·6 mm., filiform	1·6–2 mm., subulate, acute, curved	1
3	1·4–1·6, oblong, obtuse	1·4–2	2·8–3·7 × 1·4–1·6, oblong, obtuse	entire or produced to a tooth, not ciliate	0·5–0·7 mm., subrhomboid, subterete or clavate obtuse or acute	21
2·6	2 × 1·4–1·6, oblong, obtuse	2	3 × 2–2·6, oblong, obtuse	truncate, not ciliate	1 mm., fusiform-clavate, acute, incurved	1
4	1–2, ovate, acute or obtuse	2–2·6	3–3·7 × 1–1·4, oblong or lanceolate, obtuse	truncate, not ciliate	1 mm., oblong-spathulate, obtuse or acute	13
to	1·5, ovate, sub-obtuse	1·5	3, subobtuse	—	—	(1
5	1·5, ovate, obtuse	2	4, oblong, acute	polymorphic	0·8 mm.	(1
4	2 × 1·4, oblong, obtuse	3	6·3 × 2, oblong, obtuse	produced into linear, truncate or bifid tooth 5 mm. long	0·7 mm. clavate, obtuse	1

TABLE II. The distribution of the species given in the Flora of Tropical Africa, and that admitted here.

	Senegal	French Sudan	Ivory Coast	Gold Coast	Togoland	Dahomey	Nigeria	British Cameroons	French Cameroons	Sudan	Ruanda-Urundi	Uganda	Kenya	Tanganyika	Belgian Congo	Angola	Northern Rhodesia	Southern Rhodesia	Bechuanaland	Nyasaland	Mozambique	Transvaal	Natal	Cape Province
Ectadiopsis oblongifolia ...	–	?																						
E. producta ...	...																							
7. *Cryptolepis hensii* ...				–	–		–			–	+	–	+	–	–	–	–	–	–	–	–	–	–	–
9. *C. baumii* ...																								
10. *C. brazzaei* ...																								
11. *C. welwitschii* ...																								
12. *C. angolensis* ...																								
13. *C. oblongifolia* ...																								
14. *C. elliottii* ...											+													
15. *C. nigricans* ...					–		–					–					–	–		–				
— *C. debeerstii* ...															+									
16. *C. suffruticosa* ...														+										
8. *C. producta* ...																+								
— *Ectadiopsis buettneri* ...														–										

On p. 278 I postulate that *Ectadiopsis producta* may be a derivative of *E. oblongifolia* by chromosome disturbance ; the variation in flower size shown in Table I also may well indicate genetic instability.

SENEGAL. Dabola ; June 1902 (fl.), *Pobéguin* 352.

FRENCH SUDAN. Hutchinson and Dalziel (1931 record *Cryptolepis nigritana* as " common " in the savannah of this country, but I have not seen any material, and it was not recorded from this area by Bruce (1946). There is no reason why it should not occur here, however, and I would also expect it to be found in the savannah of French Guinea, Ivory Coast and Dahomey.

GOLD COAST. Kitampo ; March 1920 (fl.), *Dalziel* 46. Parria to Nebimpo ; May 1927 (sterile), *Kitson* 742. Bole (N.T.) in savannah forest ; " herb 2–3 ft. high " ; May 1935 fl., *Vigne* 3828. Gambaga N.T., 1300 ft. ; " shrub with several thin stems from a rootstock " ; July 1938 (fl.), *Vigne* 4536.

TOGOLAND. " Grassteppen in Ayanga " ; Feb. (fl.), *Büttner* 404.

NIGERIA. Nupe ; " herbaceous, 4 ft., flowers pale yellow " ; *Barter* 1324. Zungeru ; Aug. 1905 (fl.) ; Kontagora ; Nov. 1905 (fr.), *Dalziel* 7. Naraguta ; " two feet, flowers yellow " ; *Lely* 63. Nabardo, 2300 ft. ; " stem rough and sticky, flowers yellow " ; May 1921 (fl.), *Lely* 216. Vom, 3000–4500 ft. ; " two feet, flowers yellow " ; *Dent-Young* 174. Bauchi, in savannah or grassland ; " woody perennial with small axillary yellow flowers " ; Feb. 1929 fl., *Lely* 152 ; Jan. 1929 fl., *Lely* 153. Naraguto Reserve, Jos District ; " shrub 2 ft. high, common " ; July 1944 (fl.), *Kennedy* 7273. Near western boundary of Upper Ogun Forest Reserve, about 8 mls. east of Igboho, Oyo District, in open savannah with *Daniellia* and *Gardenia erubescens* ; " young shoots from a woody stock, up to 1·5 m. high, more or less erect but whippy, brown below, purplish when young ; leaves glaucous green below, darker and shining above ; peduncle, pedicels and calyx pale green, corolla creamy-yellow " ; Feb. 1948 (fl.), *Keay* 22509. Kan Gimi, Anara Forest Reserve, Zaria Province, in open *Isoberlinia doka* woodland on ironstone soil ; " suffrutex with long, whippy, brown branches up to 1·5 m. long ; leaves glaucous green ; flowers cream " ; May 1948 fl., *Keay* 22939. Mande Forest Reserve, about 2 mls. north of Rafin Taba, Zaria Province, in *Isoberlinia* open woodland ; " erect shrub, stem crimson-brown, leaves pale glaucous-green below ; flowers yellow " ; June 1950 (fl., fr.), *Keay* 25841.

BRITISH CAMEROONS. Abakpa, Bamenda District, among rocks on farm land ; " shrub, upper surface of leaves green, underside white ; flowers yellow ; gummy latex " ; May 1951 fl., *Ujor* 30096. Bamenda, 5000 ft., in stony grassland ; June 1931 (fl.), *Maitland* 1694.

FRENCH CAMEROONS. Buar, about 1000 m. ; May 1914 (fl.), *Mildbraed* 9370. Mbussa, 800–900 m. ; April 1914 (fl., *Mildbraed* 9136. Kunde, 900 m., May 1914 (fl.), *Mildbraed* 9226. Without locality or date, *Mildbraed* 10226.

BELGIAN CONGO. Lutété, River Ntombi, 1800–2000 ft. ; " flower white " ; Feb. 1888 fl., *Hens* 227 *typus* ; *Cryptolepis hensii* N.E. Br.). Kitimbo ; Jan. 1908 (fl.), *Kässner* 2350. Elisabethville, 4800 ft. ; Oct. 1911 fl., *Rogers* 10056. Nieuwdorp ; Oct. 1912 (fl.), *Rogers* 10409. Elizabethville ; Dec. 1919 fl., *Shantz* 512. Boitofort ; March 1926 fl., *Robyns* 1639. Kamina ; 1932 fl., *Quarré* 2987. Elizabethville ; 1934 (fl.), *Quarré* 3623.

SUDAN. Yei River, Lado ; " shrub 10–15 ft." ; 1919 (fl.), *Sillitoe* 310. Imatong Mts. : near Rest house, Mt. Baghanj ; " herb 1 m., flowers yellow ; abundant, rope made from bark " ; June 1939 (fl.), *Andrews* 1921 : Mt. Itobol, 6400 ft. ; " herb 3 ft., abundant " ; June 1939 (fr. in spirit), *Andrews* 1975 : without exact locality ; 1947 (fl.), *Maxwell Forbes* 118. Tondy River ; July 1870 (fr.), *Schweinfurth* 4050.

UGANDA. Dry grassy hills, east side of Lake Albert Edward ; *Scott-Elliot* 8066. Western Toro ; " about 3 ft., stem reddish-brown, leaves pale green ; flowers orange-chrome " ; *Doggett ex Johnston* s.n. Mawokota, 3900 ft. ; Feb. 1905 (fl.), *Brown* 144. Bugoma, Unyoro, 4500 ft., on hillsides ; " two to three ft." ; *Dawe* 716. Ankole hills, 5000 ft. ; *Dawe* 414. Elgon district : *James* s.n. Kufu River ; *Fyffe* 95. Without locality : June 1915 fl., *Maitland* s.n. Stony hill range near Salama, frequent ; " 3 ft., flowers creamy " ; July 1915 (fl.), *Dümmer* 2731. Ankole ; *Fyffe* 29. Kyasoweri, Mt. Elgon, 6000–7000 ft. in savannah ; " suffruticose herb 2–3 ft., milky latex in young parts ; flowers yellow " ; April 1927 (fl., *Snowden* 1071. Rom Mt., about 7000 ft., in grassland near the summit ; " shrub about 18 ins. ; whitish flowers " ; June 1930 (fl.), *Liebenberg* 171. Serere, Teso, 3600 ft. ; " shrubby, 4–4·5 ft., very milky sap ; flowers yellow " ; Dec. 1931 fl., fr., *Chandler* 133. Busana, Bugerere, 3500 ft., occasional in short grass land ; " shrub 4–5 ft., stems reddish ; flowers yellow " ; April 1932 (fl., *Eggeling* 346. Wabisana, Bulemezi, 3800 ft., occasional on dry hill side ; " shrub, 5 ft., stems reddish ; flowers creamy yellow " ; June 1935 (fl.), *Thomas* 1269.

Arua, West Nile ; " 4–6 ft. ; flowers yellow " ; March 1938 (fl.), *Hazel* 457. Kibangya, Bunyoro, 3800 ft., occasional in grassland ; " scrambling shrub, 5 ft. ; flowers pale yellow " ; May 1941 (fl.), *Thomas* 3909. Kitoba, Bunyoro, 3500 ft., in savannah ; " small shrub ; flowers whitish " ; April 1942 (fl.), *Purseglove* 1217. Nyakegeri, Kigezi, 5000 ft., in grassland ; " shrub, 3 ft. " ; Nov. 1946 (fr.), *Purseglove* 2240. Kazindiro, Rhuzhumbura, Kigezi, 5000 ft., in short grassland ; " lactiferous shrub, 2 ft. ; flowers yellow " ; Oct. 1947 (fl.), *Purseglove* 2560. Kanungu, 5000 ft., in grassland ; " woody, 3 ft., with latex " ; June 1952 (fl.), *Lind* 53.

Kenya Colony. Without locality ; Dec. 1921 (fl.), *Lankester* s.n. Bana, Kisii District, 5000 ft., in long grass parkland ; " dwarf shrub or woody herb ; flowers cream " ; Sept. 1933 (fl.), *Napier* 5333. Emali-Garabani, about 5000 ft. ; July 1940 (fr.), *Opiko ex Bally* 308.

Ruanda-Urundi. Urundi hills, 4000–5000 ft. ; Sept. 1893 (fl.), *Scott Elliot* 8372 (*typus* ; *Cryptolepis elliotii* Schltr.).

Tanganyika Territory. Kyimbila District, 1000 m. ; Jan. 1911 (fl.), *Stolz* 507. Tunduru District, 2600 ft. ; *Allnutt* 43. Mbosi, Rungwe District, 6000 ft. ; " shrub ; flowers white " ; April 1932 (fl.), *Davies* 480. Undali, 6000 ft. ; Feb. 1933 (fl.), *Davies* 849. Western escarpment, Rukwa Valley, 6500 ft., common in open bush along the Kisa path ; " undershrub, 3 ft., tufted, from a woody rootstock ; flowers white " ; Dec. 1934 (fl.), *Michelmore* 1084. Iringa ; June 1936 (fl.), *Emson* 516. Urambo ; Jan. 1950 (fl.), *Moors* 46.

Northern Rhodesia. Broken Hill ; Dec. 1907 (fl.), *Kässner* 2019. Mumbwa ; *Macaulay* 683, s.n. About 28 mls. east of Mwinilunga, in sandy open ground at edge of woodland ; " perennial herb with woody rootstock and white latex ; flowers yellow " ; Sept. 1930 (fl.), *Milne-Redhead* 1085. East of Lake Bangweolo, in wooded plain ; " undershrub with white latex " ; Sept. 1933 (fr.), *Michelmore* 581. Mufulira, on the railway line ; " radially procumbent branches up to 90 cm. long, with milky latex ; flowers white " ; April 1934 (fl., fr.), *Eyles* 8269. Slope north and east of Matonchi Farm, Mwinilunga District, in *Brachystegia* woodland ; "perennial twiner, leaves dull purplish-green, stems purplish ; flowers yellowish-white " ; Oct. 1937 (fl.), *Milne-Redhead* 2577. *Ibid.* ; Feb. 1938 (fr.), *Milne-Redhead* 2577A. Mufulira ; " trailing plant with milky juice " ; Oct. 1947 (fl.), *Cruse* 11. Abercorn, in cleared *Brachystegia* woodland ; " perennial, stems from a woody rootstock ; flowers greenish cream " ; Oct. 1949 (fl.), *Bullock* 1123. Kalambo Falls, Abercorn District, in woodland at the head of the gorge ; " subshrub to 2 ft. ; flowers white or cream " ; Jan. 1950 (fl.), *Bullock* 2195. Abercorn—Kawimbi ; Nov. 1954 (fl.), *Robertson* 245. Near Choma, Mazabuka District, with sparse grass and other suffrutices in *Uapaca kirkiana U. nitida-Isoberlinia globiflora* woodland, in shallow ironstone soil ; " suffrutex 0·3–0·45 m. high, stems wiry, sparsely branched, leaves pale glaucous-green beneath, corolla very pale yellow ; copious latex " ; Jan. 1952 (fl.), *White* 1896*. Sikongo Forest Reserve, near Malondo River, Kalabo District, in open *Burkea* woodland ; " woody twiner 1–2 m. high ; stems exude copious white, sticky latex ; leaves dark green above with conspicuous pale green venation, pale green beneath with dark green venation, petiole purple-red ; fruit grey-purple ; vernacular : Mukwetinge (Chilozi) " ; Feb. 1952 (fr.), *White* 2081. Siamambo Forest Reserve, Choma, Mazabuka District, in *Uapaca kirkiana—Isoberlinia globiflora* woodland on shallow ironstone soil ; " wiry shrub 1 m. high " ; April 1952 (fr.), *White* 2644. 7 mls. north of Kalena Hill Mission, Mwinilunga District, in *Brachystegia longifolia Isoberlinia paniculata* woodland, on Kalahari sand ; " suffrutex, stems tufted, arising from woody underground rootstock, burned back to ground level every year ; flowers white " ; Sept. 1952 (fl.), *White* 3363. 10 mls. west of Caenby Farm, Mwinilunga District, in open *Brachystegia spiciformis–Erythrophloeum africanum–Pterocarpus angolensis Burkea africana* woodland, on alluvial slope ; " shrub 0·6 m. high, stems tufted, flowers white " ; Sept. 1952 (fl.), *White* 3415. Kalambo Falls, Abercorn District, in *Brachystegia allenii* woodland on rocky escarpment slope ; " suffrutex, stems tufted, 0·6 m. high, burned back to ground level every year, flowers white " ; Oct. 1952 (fl.), *White* 3644. Near the golf course, Ndola, in regrowth woodland with *Isoberlinia tomentosa, Swartzia, Parinari mobola, Diplorrhynchus, Lannea discolor*, etc. ; " suffrutex with twining stems, leaves dark green, flowers white " ; Oct. 1952 (fl.), *Angus* 650. Upper slopes of Mafingi Mts., 7300 ft., 5 mls. east of Chisenga Rest House, Isoka District ; " suffrutex, flowers pinkish-yellow " ; Nov. 1952 (fl.), *Angus* 818A. Great North Road, 2 mls. east of Kapiri Mposhi, Broken Hill District, in *Isoberlinia paniculata* woodland on white sandy loam ; Dec. 1952 (fl.), *Angus* 910. Without data (fr.), *Fewdays* 25. Luwinga to Kawambwa, in almost white sandy loam, with *Phyllanthus* and *Eragrostis* in a *Uapaca–Terminalia* stand in *Brachystegia-Parinari Dracaena* woodland ; " shrubby herb with numerous stems up to 15 ins. tall ; flowers white, inconspicuous " ; Oct. 1947 (fl.), *Brenan and Greenway* 8215. Butondo River slopes, Mufulira District, with *Aristolochia* and *Fadogia* in coppicing

*Duplicates of this and other numbers collected by Messrs. *White*, *Angus* and *Fewdays* are in the Imperial Forestry Institute Herbarium, Oxford.

Brachystegia Utapaca woodland, locally common but scattered, on grey-brown loam ; " a perennial twining many-stemmed herb up to 3 ft. tall, from a woody rootstock, with clusters of small white flowers " ; Sept. 1947 fl. , *Brenan and Greenway* 8119. Path to Dog's Grass, Chilongowelo [Abercorn–Mpulungu], in rough stony ground, 4900 ft. ; " woody, branching, 18 ins. high, stem rough, brown ; leaves narrow, glabrous ; flowers small, greenish-white " : Dec. 1951 fl. , *Richards* 123. " Lake Tanganyika " ; *Cameron* s.n.

Southern Rhodesia. Chirinda, Gazaland, 3800 ft. : " shrub 3–4 ft., with tough bark-fibre used for thread and fine cord, and milky latex " ; April 1905 (fl.), Oct 1905 fl., fr. , *Swynnerton* 243. Umvumvumvu River, 2000 ft. ; April 1907 sterile), *Swynnerton* 243a. Melsetter : fr. , *Schlechter* s.n. Odzani River valley, Umtali District Manicaland : 1915 fl. , *Teague* 481. Salisbury : " erect or twining suffrutex with milky latex : flowers cream " : Dec. 1919 fl. , *Eyles* 1960. Enkeldoorn, 4800 ft. ; Dec. 1920 fl. , *Mainwaring* 2795. Near Mt. Selinda, Melsetter : " small undershrub or climber with white latex ; stem fibres said to be used for fishing lines " ; July 1934 fr. , *Michelmore* 306. Chipinga, 2900 ft. : June 1934 fr. , *Michelmore* 269. Melsetter, 4000 ft. ; Feb. 1907 (fl., young fr.), *Johnson* 132.

Nyasaland. Stevenson Road, 5000–6000 ft. ; Nov. 1893 (fl.), *Scott Elliot* 8264, 8314. Moramballa Mt. : Dec. 1893 fl. , *Scott Elliot* 8450. Manganja Hills, 2000 ft. ; " the plant used for making many of the fish nets at Lake Nyasa " : March 1862 (fr. , *Kirk* s.n. Moramballa Mt., 1500 ft. : Jan. 1863 fl. , *Kirk* s.n. Western shore of Lake Nyassa, 1600 ft. 12° S. : *Kirk* s.n. Shire Highlands : *Buchanan* 251, 1091. Chikala, 2000 ft. ; " shrub 6–8 ft. " ; Nov. 1900 (fl.), *Manning* 1. Ntondwe ; *Cameron* 116. Shire Highlands : *Adamson* 143. Near Great North Road, 30 mls. north-west of Njakwa, Rumpi District, Northern Province, 5000 ft., in *Brachystegia manga B. floribunda–Isoberlinia paniculata* woodland ; " shrub 0·6 m. high " ; May 1952 (fr.), *White* 2816. Shire Highlands ; *Adamson* 143.

Mozambique. Between Massi Kessi and Revue ; " bush with yellowish-green flowers " ; *Cecil* 239. Chua, Manicaland, 2000 ft. ; " 2–3 ft., latex abundant ; flowers pale yellow " ; Nov. 1906 (fl.), *Johnson* 45. Unango, 13° 03′ S., 35° 10′ E. ; Dec. 1932 (fl.) ; *Gomes e Sousa* 1038. Gurue ; June 1942 (sterile), *Hornby* 4554. Tacuane, Lugela, Quelimane, 2500 ft. ; " small bush ; flowers scented, yellow " ; Jan. (fl.), *Faulkner* K.113.

Angola. Pungo Andongo, 2400–3800 ft., plentiful in the thickets of the praesidium ; " a form with long slender twining stems : flowers white " ; Feb. fl. , *Welwitsch* 4197 *isotypus* ; *Cryptolepis brazzaei* Baill. . Huilla, 3800–5500 ft., in thickets amongst short grass ; " small shrub 1·5–2·5 ft. ; flowers white " ; Dec. 1859 (fl.), *Welwitsch* 4203 *isotypus* ; *Ectadiopsis welwitschii* Baill. . Huilla, in sandy thickets near Lopollo also near Pungo Andongo, *ride* Welwitsch : " shrub 2–4 ft., decumbent-sarmentose or rarely twining : flowers white, sweet-scented " : Jan. 1860 fl. , *Welwitsch* 4204 *isotypus* ; *Cryptolepis angolensis* Welw. ex Hiern . Cahama, in open places in *Bauhinia* forest ; " bush 1·5–3 ft. " ; May 1909 (fl.), *Pearson* 2433. Fort Princeza Amelia, Catoca, Cubango : fr. , *Gossweiler* 4003. Bie, Bihe, 1300 m. : fl. , *Gossweiler* 9469. River Longa, below Napalanka, Amboella : Dec. 1899 fl. , *Baum* 577 *typus* ; *Cryptolepis baumii* N. E. Br. : *isotypus* ; *C. scandens* Schltr.). In thickets near Huilla ; " shrublet 0·5–1·5 ft., subsarmentose ; flowers yellowish " ; Nov. 1859 (fl.), *Welwitsch* 4205 (*isotypus* ; *Cryptolepis welwitschii* var. *luteola* Hiern . Lopollo, Huilla, plentiful in thickets ; " low sarmentose, twining shrub, or occasionally erect, lactescent ; flowers white " ; fl. , *Welwitsch* 4206 *isotypus* ; *Ectadiopsis myrtifolia* Baill. . Malange ; Jan. 1888 (fl.), *Marques* 15 *typus* ; *Cryptolepis sizenandi* Rolfe . Malange : fr. , *Gossweiler* 1132. Ulondo Mts., 15° 05′ E., 12° 44′ S., 1360 m. : *Wellman* 1785 *typus* ; *Cryptolepis linearis* N. E. Br.). Huambo, Benguela high plateau, 1600 m., in herb-grown thickets : Dec. 1933 (fl.), *Gossweiler* 9745.

Transvaal. Magaliesberg ; Dec. (fl., fr.), *Burke* 322 (*typus* ; *Ectadium* ? *oblongifolium* Meisn. . Johannesburg : Dec. 1898 fl. , *Gilfillan* 6144. Rustenburg : Jan. 1904 fl. , March 1904 fr. , *Nation* 23, 115. Barberton : Nov. 1915 fl. , *Rogers* 18357. Naboomfontein, Potgietersrust, frequent on mountain side ; " shrublet 2 ft. high ; flowers creamy white " : Dec. 1934 fl. , *Galpin* 13472. Ten mls. south-east of Mbabane, Swaziland, in subtropical open woodland with tall grass ; " diffusely branched from base " ; Nov. 1948 (fl.), *Codd* 4753. Doornkloof, Irene ; " flowers greenish " ; Jan. 1929 fl. , *Hutchinson* 2394. Near Louis Trichard, Zoutpansberg : Dec. 1928 (fl. , *Hutchinson* 2032. Near Pretoria ; (fl., fr.), *McLea* 5701. Pretoria hills, 4500 ft. ; April 1904 (fl., fr.), *Leendertz* 145, 345. Johannesburg ; (fl.), *Conrath* s.n. Aapies Poort, Pretoria : fl., fr. , *Rehmann* 4159. Near Oliphant River, Middleburg ; Nov. 1893 fl. , *Schlechter* 3804. Heidelberg : Nov. Dec. 1927 fl. , *Thode* 1327. Shilouvane ; Jan. fl. , *Junod* 864. Pretoria : Oct. 1919 fl. , *Phillips* 3123. Lomati valley, Barberton : fl. , *Thorncroft* s.n. Near Koedoespoort : Dec. 1925 fl. , *Smith* 1530. Buffelspoort, Rustenburg ; Nov. 1934 (fl.), *Turner* 28.

Bechuanaland. Lobatsi ; Dec. 1924 (fl.), *Tapscott* 2549.

Natal. Port Natal; (fl.), *Krauss* 132. Without locality; (fl.), *Gerrard* 132.* Ngome, Zululand; "shrub 3 ft., slightly woody below; flowers yellow"; Dec. 1944 (fl.), *Gerstner* 5173. Friedenau Farm, Dumisa, Alexandra, 600 m.; Feb. 1908 (fl.), *Rudatis* 272: *ibid.*; April 1909 (fr.), *Rudatis* 641. Inanda; June 1879 (fl.), *Wood* 446.

Cape Province. Near Botsabelo, Griqualand East; Dec. 1893 (fl.), *Schlechter* 4096.

Ectadiopsis producta (*N. E. Br.*) *Bullock*, comb. nov.

Cryptolepis producta N.E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 247 (1902), et *l.c.* 614 (1904); Eyles in Trans. Roy. Soc. S. Afr. **5**, 446 (1916).

C. baumii Schltr.† in Warb. Kunene-Sambesi Exped. Baum, 340 (1903), non N. E. Br. (1902).

This species has been collected relatively few times, and at rather widely separated localities from Angola eastwards to southern Tanganyika and Nyasaland; its area thus lies entirely within that of *E. oblongifolia*, and also within the area where that species is most variable. Nothing can be said as to its local abundance, but one collector (*R. M. Davis*) notes that it is "common".

On account of the large size of its flowers, Brown (1902) keyed it out among the species which I have retained among *Cryptolepis*; with these it has little affinity, but is certainly very closely allied to *E. oblongifolia*, which includes all those species which Brown keyed out with smaller flowers,—"Corolla-lobes 1–2 lin. long". Apart from its larger flowers,—the corolla-lobes are "3 lin." long—there is little to separate *E. producta* from *E. oblongifolia*. The only fruiting specimen I have seen shows shorter, stouter follicles, but these are not mature and I imagine that fully ripe fruits would simply be somewhat larger than in *E. oblongifolia*. Both vary in the same way in regard to amount and kind of indumentum and in leaf-size and shape, but *E. producta*, although often almost or quite glabrous, may be more pubescent than any specimen I have seen of *E. oblongifolia*.

These are exactly the differences one might expect in a polyploid as compared with a plant with a normal diploid chromosome complement and it is suggested that *E. producta* may be derived from *E. oblongifolia* by some kind of chromosome distrubance,—possibly polyploidy.

Tanganyika Territory. Mbozi, Zombi, 5300 ft.; Nov. 1932 (fl.), *Davis* 661.

Belgian Congo. Elizabethville; *Quarré* 854.

Northern Rhodesia. Slope south-east of Matonchi Farm, Mwinilunga District, in open ground among *Cissus*, *Sphenostylis*, etc.; "shoots more or less erect from a woody rootstock, corolla reddish outside, creamy yellow inside"; Oct. 1937 (fl.), *Milne-Redhead* 3040. Mumbwa; (fl.), *Macaulay* 931; (fl., young fr.), 932. Solwezi Road, 30 mls. south of Mwinilunga. on watershed plain of Kalahari sand, with *Parinari capensis*, *Ochna* spp., *Combretum platypetalum* and other suffrutices; "suffrutex with a stout woody rhizome; cut stems exude copious white latex; leaves dark green, glossy above; flowers in bud greenish yellow"; Sept. 1952 (fl.), *Angus* 487. Mazabuka District, 1 km. south of Masuku Mission, on shallow quartzite soil in open *Uapaca kirkiana–Isoberlinia globifera* woodland; "semi-procumbent suffrutex up to 0·8 m. high; stems burned back to tuberous woody rootstock every year; decoction of roots used to cure stomach-ache"; March 1952 (fr.), *White* 2338.

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* The Kew sheet is annotated by N. E. Brown, "In the Dublin Herbarium this plant of Gerrard's is numbered 10, from 'Palmist River, Natal', and 595 from 'Near Durban'."—A.A.B.

† Although Schlechter's description did not appear until 1903, the labelled specimen was received at Kew before Brown completed his manuscript and he could have adopted Schlechter's name instead of using it for another species!—A.A.B.

Southern Rhodesia. Victoria Falls ; Jan. 1906 fl. , *Allen* 239.* Salisbury, Dec. 1936 (fl.), *Eyles* 8850. Rusapi ; *Hislop* s.n. Mgunje, Urungwe Reserve, 4000 ft., in *Brachystegia boehmii* woodland ; " semi-trailing or erect from a perennial rootstock ; flowers yellowish, lobes purplish outside " ; Nov. 1953 (fl.), *Wild* 4244.

Nyasaland. Mwawa Village, Fort Johnston ; " semi-woody plant from a woody rootstock, stems purple, with pale yellow short hairs ; flowers purple outside, yellow-brown-green inside ; sap milky " ; Dec. 1954 (fl.), *Jackson* 1431.

Angola. Above Knimarva, River Kubango, Amboella, 3600 ft. ; Nov. 1899 (fl.), *Baum*, 457 (*holotypus*).

Cryptolepis *R. Br.*

In an earlier contribution to this series (Kew Bull. **1953,** 360 : 1953) I have excluded *Curroria* Planch. ex Benth. from this genus as understood by N. E. Brown in the *Flora of Tropical Africa* and in this one (*antea*, p. 267 I have excluded *Ectadiopsis* Benth. and also drastically reduced the number of species. As I understand it, the genus now remains as defined by Robert Brown (1809) and by Bentham in the *Genera Plantarum* (1876). The close resemblance of the Asiatic species to those of Africa is emphasized by my description (*infra*, p. 282) of an African subspecies of *C. sinensis* (Lour.) Merr. *C. hypoglauca* K. Schum., an East African coastal species, is very nearly allied to the Indian *C. grandiflora* Wight and there is at Kew a specimen from the Cameroons (*Mildbraed* 9689) which may represent only a subspecific form. Within the African continent, *C. capensis* Schltr. from Natal and the Transkei and the more widely distributed *C. sanguinolenta* (Lindl.) Schltr. (*C. triangularis* N. E. Br. of the *Flora of Tropical Africa*) are closely allied to each other, and form a part of the same complex.

C. cryptolepioides (Schltr.) Bullock (*C. transvaalensis* Schltr. of the *Flora Capensis*) stands somewhat apart from the other species mentioned above, but may be related to *C. sinensis* by way of *C. obtusa* N. E. Br.

Of the other species mentioned in the *Flora Capensis* and the *Flora of Tropical Africa*, I have not seen *C. delagoensis* Schltr., nor have I been able to identify any material I have seen with it, and *C. microphylla* seems likely to be identifiable with *Mangenotia* Pichon. The Kew material includes only leafy stems with one or two detached flowers.

Cryptolepis albicans Jum. et Perr., described from Madagascar, should be referred to another genus. *Cryptolepis* does not, apparently, occur in the Mascarene Islands, a striking contrast to *Leptadenia* and *Pentatropis* which may be not unconnected with a forest, as compared with a semi-arid, habitat.

Cryptolepis hypoglauca *K. Schum.* in Engl. Pflanzenw. Ost Afr. **C,** 320 (1895), et in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 219 (1895) ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 244 (1902) ; Brenan, Trees Shrubs Tanganyika Terr. (2), 64 (1949).

The type material of this species was collected by *Holst* (no. 2728) at Amboni, Tanganyika, and a portion of it is preserved at Kew. No other specimens, so far as I am aware, have been recorded and the following are of some interest :—

* Eyles (1916) gives the locality " Gwaai Forest ", which is about half-way between Bulawayo and the Victoria Falls, for this collection. I have, however, quoted the label on the Kew specimen.—A.A.B.

Zanzibar. 1931 (fl.), *Vaughan* 1772.

Kenya Colony. Shimoni, Kwale District, in shrub thicket on coral rock near high water mark ; " scandent shrub, climbing by twining to 4 m., calyx green, corolla deep brownish-red, corona and column pale green, fruits dark brownish-red " ; Aug. 1953 (fl., fr.), *Drummond and Hemsley* 3917 (five excellent herbarium sheets and material in spirit !).

Cryptolepis apiculata *K. Schum.* in Engl. Pflanzenw. Ost Afr. **C,** 320 (1895), et in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 219 (1895) ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 244 (1902) ; Brenan, Trees Shrubs Tanganyika Terr. (2), 64 (1949).

This is another species first collected by *Holst* (no. 2564), at Amboni in 1893, and but rarely seen since. The new records from Southern Rhodesia are noteworthy. The follicles shown by *Chase* 5056 are horizontally divaricate, 16–18 cm. long and somewhat less than 1 cm. in diameter : those of *Faulkner* 940 are somewhat shorter and slightly reflexed.

Tanganyika Territory. Tanga District, five miles south-east of Ngomeni, 75 m. alt., in small tree and tall shrub thickets in scattered tree grassland ; " climbing by twining to 3 m., leaves bright shining green above, dull pale green beneath, calyx pale green, corolla pale greenish-yellow, anthers pale yellow " ; July 1953 (fl.), *Drummond and Hemsley* 3517 (with spirit material). Kange Estate, Tanga District, 150 ft. ; Jan.–March 1952 (fl., fr.), *Faulkner* 940.

Kenya Colony. Mida, 100 ft., in forest ; " climber, copious milky latex, flowers white " ; 1928 (fl.), *Graham* 1526.

Southern Rhodesia. Waterfall south of Drumfad, Umtali District, in a gully, near stream, 3200 ft. ; " climbing over shrubs and trees, leaves glossy, flowers yellowish " ; Nov. 1952 (fl.), *Chase* 4696. Umtali District, by stream in a wooded gully, 3500 ft. ; " twining shrub, pods spreading horizontally " ; Aug. 1953 (fr.), *Chase* 5056.

Cryptolepis sanguinolenta (*Lindl.*) *Schltr.* Westafr. Kautschuk-Exped. 308 (1900) ; Hutch. et J. M. Dalz. Fl. W. Trop. Afr. **2,** 53, f. 195 (1931).

Pergularia sanguinolenta Lindl. in Bot. Mag. t. 2532 (1825), et in Trans. Hort. Soc. **6,** 72 (1826) ; Decne. in DC. Prodr. **8,** 619 (1844).

Cryptolepis triangularis N. E. Br. in Journ. Linn. Soc. Bot. **30,** 92 (1894), et in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 245 (1902) ; Hiern in Cat. Afr. Pl. Welw. **1,** 676 (1898) ; A. Chev. Expl. Bot. Afr. Occ. Franç. 428 (1920).

C. barteri K. Schum. in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 219 (1895).

Strophanthus radcliffei S. Moore in Journ. Linn. Soc. Bot. **37,** 180 (1905).

The wide distribution of this species in West Africa, from the Gambia, French Guinea, Sierra Leone, Gold Coast and Nigeria, as well as Angola, was recorded by Hutchinson and Dalziel ; it has not been recorded from the Cameroons, Sudan or the Belgian Congo, and the following is the first record of its occurrence in East Africa, where it has, however, been misidentified as a species of *Strophanthus* !

Uganda. Nakasongola, Buruli (county), Mengo District, 3600 ft., in thicket ; " common climber with yellow flowers " ; Sept. 1943 (fl.), *Thomas* 3763. Mutunda, on the shore of Lake Victoria ; March (fl.), *Bagshawe* 589 (BM).

To Brown's (1894) original record of this species from Pungo Andongo (*Welwitsch* 5993), the following may be added :—

Angola. Cazengo ; *Gossweiler* 656. Malange ; *Gossweiler* 1136.

Cryptolepis cryptolepioides (*Schltr.*) *Bullock*, comb. nov.

Ectadiopsis cryptolepioides Schltr. in Engl. Bot. Jahrb. **20,** Beibl. No. 51, 10 (1895).

Cryptolepis transvaalensis Schltr. in Journ. Bot. **34,** 315 (1896), nomen superfluum ; N. E. Br. in Thiselton-Dyer, Fl. Cap. **4** (1), 528 (1907) ; Eyles in Trans. Roy. Soc. S. Afr. **5,** 446 (1916).

Schlechter avoided the use of his own original epithet when he transferred this species from *Ectadiopsis* to *Cryptolepis* and thereby created a superfluous name which was retained by Brown and has been tacitly accepted ever since 1896.

Both Brown and Schlechter recorded the species as a Transvaal endemic and it certainly appears to be extremely local, but Eyles recorded it as occurring at Victoria, Southern Rhodesia (*Monro* 812) and the following specimens from Southern Rhodesia are now at Kew :—

Southern Rhodesia. Matopo Hills : May 1915 (fr.), *Rogers* 7912 ; March 1929 (fl.), *Eyles* 6305 ; May 1947 (fr.), *Keay* 21293.

Cryptolepis obtusa *N. E. Br.* in Kew Bull. **1895,** 110 (June, 1895), et in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 246 (1902), et in Thiselton-Dyer, Fl. Cap. **4** (1), 528 (1907) ; K. Schum. in Engl. Pflanzenw. Ost Afr. **C,** 424 (1895), et in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 219 (1895) ; Scltr. in Journ. Bot. **34,** 315 (1896) ; Brenan, Trees Shrubs Tanganyika Terr. (2), 64 (1949).

C. obtusa K. Schum. in Engl. Pflanzenw. Ost Afr. **C,** 320 (Aug. 1895).

Brown cited six specimens under his original description of this species, without indicating the holotype. Of these the *Speke*, *Forbes* and one of the *Kirk* specimens are with fruit but without flowers and since Brown did not describe the follicles until 1902 none of these can be chosen as the lectotype. The *Kirk* (no. 38) specimen from the Luabo river consists of stems with numerous flowers but very few leaves which do not show a great deal of variation ; the *Meller* specimen is similarly floriferous and is adequately leafy, but the leaves are very uniform in size. The remaining *Kirk* specimen shows flowers and leaves, the latter with the variation in size given by Brown and to which he himself attached a copy of the published description. I have therefore selected this specimen as lectotype of the specific name.

The species is very widely distributed along the eastern coastal belt from the Transvaal to Tanganyika, and it is very similar indeed to the more widely dispersed Asiatic species *C. sinensis* (Lour.) Merr.

Two specimens from the Zoutpansberg differ slightly from the remainder of the material at Kew ; *Schweickerdt and Verdoorn* 591 is a flowering specimen in which the somewhat larger flowers are arranged in a more regularly branched cyme, whilst *Smuts* 2044 is a fruiting specimen with follicles much longer than is usual. These two specimens are very readily separable from the remainder, but I am not satisfied that they represent a distinct taxon.

The following specimens, additional to those cited by Brown (1902, 1907), are at Kew :—

Tanganyika Territory. North Morogoro, about 1500 ft., July 1930 (fl.), *Haarer* 1906.

Moçambique. Chibabava, 400 ft. ; Nov. 1906 (sterile), *Swynnerton* S65. South of Save, Lourenço Marques ; May 1950 (fr.), *Bachir* 9. Quelimane, Mocuba District ; May 1949 (fl.), Aug. 1949 (fr.), *Faulkner* 460.

Transvaal. Zoutpansberg : Foot of the 'berg ; April 1934 (fl.), *Schweickerdt and Verdoorn* 591 ; Mpefu location, Hotspring ; June 1938 (fr.), *Smuts* 2044.

Cryptolepis sinensis (*Lour.*) *Merr.** subsp. **africana** *Bullock*, subsp. nov., a typo floribus paullo minoribus paucioribus, inflorescentiis brevioribus brevius pedunculatis minus ramosis differt.

Frutex glaber, scandens, volubilis, usque 2 m. altus ; rami graciles, internodiis usque 15 cm. vel ultra longis. *Folia* petiolata, petiolis plerumque circiter 1 cm. longis rarius paullo brevioribus rarissime longioribus ; lamina oblonga vel elliptica, apice rotundata vel fere truncata vel leviter retusa, distincte mucronata, basi rotundata usque late cuneata, usque 8 cm. longa et 5 cm. lata sed plerumque minor, utrinque glaberrima, supra viridis, subtus glauca et violaceo-maculata. *Cymae* laterales (sympodialiter pseudo-axillares), pedunculis et ramis primariis subaequilongis 1·5–3 cm. longis ; bracteae bracteolaeque minutae, triangulares, acutae. *Flores* e ramis ultimis inflorescentiarum racemose dispositi, pedicellis circiter 3–4 mm. longis. *Calyx* fere ad basin 5-partitus, lobis 5 basi articulatis marginibus hyalinis oblongis subacutis 2·5 mm. longis. *Corolla* 12–13 mm. longa, lobis circiter 8 mm. longis anguste triangularibus acutis, tubo campanulato circiter 4·5 mm. longo et 2·5 mm. diametro, extra intusque glabra. *Coronae lobi* carnosi, ovoidei, 0·75 mm. longi, basi abrupte constricti et brevissime vel obsolete stipitati. *Antherae* triangulares, 0·5 mm. longae, acutae, circum stigma conniventes.

Kenya Colony. Buda[-Mafisini] Forest, 8 miles west-south-west of Gazi, Kwale District, in the shrub layer of the coastal forest ; " climbing by twining, to 2m. ; leaves green above, pale grey beneath with violet spots and blotches ; calyx pale green, corolla cream, anthers cream " ; Aug. 1953 (fl.), *Drummond and Hemsley* 3836 (with material in spirit).

Cryptolepis sinensis occurs throughout the damper regions of tropical Asia, from India to China and through the Malayan archipelago to the Philippines. It may be that the present plant will eventually prove to be a distinct species but for the time being I prefer to emphasize its similarity to the Asiatic plant.

Baroniella *Cost. et Gall.*

The Madagascar genus *Baroniella* was established by Costantin and Gallaud (1907) with one species, *B. camptocarpoides* and no other species

* Until Merrill (1919) unearthed the epithet *sinensis* for this species, it was very generally known as *Cryptolepis elegans* Wall. ex G. Don ; the somewhat extensive synonymy is as follows :—

Cryptolepis sinensis (*Lour.*) *Merr.* in Philippine Journ. Sc. **15,** 254 (1919).
Pergularia sinensis Lour. Fl. Cochinch. 169 (1790).
Emericia chinensis Schultes in Roemer et Schultes, Syst. Veg. **4,** 402 (1819).
Vallaris sinensis (Lour.) G. Don. Gen. Syst. **4,** 79 (1837).
Cryptolepis elegans Wall. (Cat. no. 1639) ex G. Don. *l.c.* 82 ; Hook. f. Fl. Brit. India, **4,** 6 (1883).
C. pauciflora Wight, Ic. Pl. Ind. Or. t. 493 (1841).
C. laxiflora Blume, Mus. Bot. Lugd. Bat. **1,** 147 (1850).
Echites laxiflora Zipp. ex Blume, *l.c.*, in syn.
Aganosma edithae Hance in Ann. Sc. Nat. Sér. 5, **5,** 227 (1866).
Echites pauciflora Heyne in Herb. Rottl. ex Hook. f., *l.c.*, in syn.
Apocynum orixense Heyne in Herb. Rottl. ex Hook. f., *l.c.*, in obs, nom. abort.
Nerium pauciflorum Roxb. (Ic. ined.) ex Hook. f., *l.c.*, in syn.—A.A.B.

has hitherto been referred to it. On the basis of the description of the East African genus *Baseonema* Schltr. et Rendle (1896) and a figure provided by the authors, Choux (1913) referred three new Madagascar species to *Baseonema* and later (1914) transferred *Baroniella camptocarpoides* to it. Choux (1931) restated this extension of the taxonomic limits of *Baseonema* when he listed the *Asclepiadaceae* in the Catalogue of Plants of Madagascar.

In 1914 Choux gave a long discussion of the characters of his four species, together with photographs of herbarium specimens of the three new ones, for which he also provided formal descriptions. All of them are slender twining lianes of forest country and although the absolute floral characters of *Baseonema* as described by Schlechter and Rendle may be repeated in them, the flower form and the habit are so very different that their generic separation is amply justified. Further, from the phytogeographical point of view, the absence of forest species of *Baseonema* in continental Africa makes the presence of four forest species in Madagascar at least doubtful. I know of no similar generic distribution in the whole family. The continental distribution of *Baseonema gregorii* Schltr. et Rendle is certainly more extensive than was supposed (Bullock, 1953 a, b), but it is confined to semi-arid country.

I therefore propose to restore the genus *Baroniella* for the four Madagascar species, and three new combinations are required :—

Baroniella acuminata (*Choux*) *Bullock*, comb. nov.

Baseonema acuminatum Choux in C. R. Acad. Sc. Paris, **156,** 2003 (1913), in obs.

Baroniella linearis (*Choux*) *Bullock*, comb. nov.

Baseonema lineare Choux, *l.c.*, in obs.

This species was first collected in central Madagascar by *Baron* (nos. 231, 403) about 1880.

Baroniella multiflora (*Choux*) *Bullock*, comb. nov.

Baseonema multiflora Choux, *l.c.*, in obs.

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Pentatropis *Wight et Arn.*

The generic name *Pentatropis* is usually attributed to R. Brown, who first used it in his appendix to Salt's " Voyage in Abyssinia " (1814). The first description of the genus, however, is by Wight and Arnott in

Wight's " Contributions to the Botany of India " (1834), where they definitely state (p. 53), " As we are unacquainted with *P. cynanchoides* (Brown in Salt. abyss. app.), or in what respect it differs from the Indian species . . . . " It is clear, therefore, that the generic name must be attributed to Wight and Arnott, and that the holotype-species is the one species known to them,—*P. microphylla* (Roxb.) Wight et Arn. (*Asclepias microphylla* Roxb.), here identified with *P. capensis* (Linn. f.) Bullock.*

The genus was maintained by Decaisne (in DC. Prodr. **8,** 536 : 1844), who included in it four species, *P. microphylla* from India, *P. spiralis* (Forssk.) Decne. from Tropical Africa and Arabia, *P. madagascariensis* Decne. from Madagascar and *P. linearis* Decne. from Australia. Several Australian species and one from New Guinea have been described, but these, together with *P. linearis*, should be referred to another genus. Similarly *P. officinalis* Hemsl., a Chinese plant, does not belong here, and is probably a poor specimen of *Cynanchum acutum* Linn., whilst *P. madagascariensis* does not differ from *P. spiralis*.

N. E. Brown pointed out in the *Flora Capensis* that *Cynanchum capense* Linn. f. was described from a specimen collected in India by *König* which is identical with *Pentatropis microphylla*. The *Sparmann* specimen also cited (but not described) by the younger Linné is the plant which has been known as *Cynanchum capense* Thunb. but is now correctly named *C. ellipticum* (Harv.) R. A. Dyer. The Indian plant therefore unfortunately requires to be renamed *P. capensis* (Linn. f.) Bullock.

The genus as I understand it includes only two species,—*P. capensis* from north-eastern and peninsular India and Ceylon and *P. spiralis* (the synonymy of which is given below) from northwestern India and the Orient and tropical Africa. The two species are extremely closely allied to each other and a study of the Indian plants in the area where their ranges are nearest together may well reveal that they should be treated as subspecies of a single species.

Pentatropis spiralis (*Forssk.*) *Decne.* in Ann. Sc. Nat. Sér. 2, **9,** 327, t. 11 E (1838), et in DC. Prodr. **8,** 536 (1844) ; Benth. in Hook. Nig. Fl. 454 (1849), in obs. ; Boiss. Fl. Orient. **4,** 58 (1879) ; Hook. f. Fl. Brit. India, **4,** 19 (1883) ; Penzig in Atti Congr. Internaz. 1889, 349 (1893) ; Defl. Asclep. Arab. Trop. in Mém. Inst. Egypt. **3** (2), 259 (1896) ; Post, Fl. Syria, Palest. Sinai, 526 (1896), et *l.c.* ed. Dinsmore, **2,** 192 (1933) ; K. Schum. in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 251, 258, f. 73 P-Q (1895) ; Pirotta, Fl. Col. Eritrea, 216 (1904) ; Blatter, Fl. Arab., in Rec. Bot. Surv. India, 8, 297 (1921) ; Chiov. Fl. Somala, **1,** 221 (1929), et *l.c.* **2,** 296 (1932) ; Schwartz, Fl. Trop. Arab. in Mitt. Inst. Bot. Hamburg, Festschr. Winkler, **10,** 190 (1939) ; Hutch. et Bruce in Kew Bull. **1941,** 146 (1941).

Asclepias spiralis Forssk. Fl. Aegypt.-Arab. 49 (1775).

Pentatropis senegalensis Decne. in Ann. Sc. Nat. Sér. 2, **9,** 328 (1838), et in DC. Prodr. **8,** 536 (1844), in syn.

P. madagascariensis Decne. in DC. Prodr. **8,** 536 (1844).

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* **Pentatropis capensis** (*Linn. f.*) *Bullock*, comb. nov. *Cynanchum capense* Linn. f. Suppl. 168 (1781), non Thunb. (1794). *Pentatropis microphylla* (Roxb.) Wight et Arn. Contrib. Bot. India, 52 (1834) ; Hook. f. Fl. Brit. India, **4,** 20 (1883).

Tylophora cirrosa Aschers. in Schweinf. Beitr. Fl. Aethiop. 132 (1867).

Pentatropis cynanchoides var. *longepetiolata* Engl. Hochgebirgsfl. Trop. Afr. 343 (1892).

Pentarrhinum fasciculatum K. Schum. in Engl. Pflanzenw. Ost Afr. **C,** 323 (1895).

Pentatropis hoyoides K. Schum., in Ann. Istit. Bot. Roma, **7,** 40 (1898) ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 381 (1902), sub. spp. imperf. conn. ; Chiov. Fl. Somala, **2,** 297, f. 173 (1932).

P. cynanchoides R. Br. in Salt, Voy. Abyss. App. 64 (1814), nomen ; Wight et Arn. Contrib. Bot. India, 53 (1834), in adnot., sine descr. ; Decne. in DC. Prodr. **8,** 536 (1844), in syn. dub. ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 380 (1902), descr. angl. ; Pirotta, Fl. Col. Eritrea, 217 (1904).

P. cynanchoides var. *senegalensis* (Decne.) N. E. Br. *l.c.* 381 ; Hutch. et J. M. Dalz. Fl. W. Trop. Afr. **2,** 54 (1931).

P. fasciculatus (K. Schum.) N. E. Br. *l.c.* 381.

P. rigida Chiov. Rec. Sc. Miss. Stefan.-Paoli Somal. Ital. **1,** 114 (1916).

Hooker (1883) remarked that *P. spiralis* differed from " *P. microphylla* " in having long-tailed corolla-lobes ; this is certainly true in that the latter apparently never produces flowers with the corolla-lobes drawn out into a long point, but the character is extremely variable in *P. spiralis* and in some specimens the corolla-lobes are not more than broadly triangular. I have listed below the African material at Kew ; there is also material from Madagascar and the Comoro Islands, as well as from the Orient, Pakistan and India.

Senegal. Without locality ; Dec. 1823 (fl.), *Roger*. Without locality, *Heudelot* 530.

French Sudan. Rharnus ; Sept. 1927 (fl.), *Hagerup* 321.

Nigeria. Katagum District ; August 1907 (fl.), *Dalziel* 94.

Sudan. Barboi, White Nile ; June 1906 (fl.), *Broun* 994. Bor, Bar el Gebel ; July 1929 (fl.), *Simpson* 7248. Suakin, Gebel Uaratab ; June 1867 (fl.), *Schweinfurth* 219. Tokar Delta, near Tagdara Hill ; April 1949 (fl.), *Bally* 6981.

Ethiopia. Otao ; April 1885 (fl.), *Johnston* 4. Without locality ; *Bent* s.n. Sarat, Massaua ; *Steudner* 199 (= 752). Asciascialle, Ogaden ; July Aug. 1891 (fl.), *Robecchi Bricchetti* 321 (F). Masgol, Ogaden ; July–Aug. 1891 (fl.), *Robecchi Bricchetti* 330 (F). Ajab, Ogaden ; July–Aug. 1891 (fl.), *Robecchi Bricchetti* 333 (F).

Somalia. Mogadishu, on dunes ; Aug. 1937 (fr.), *Senni* 1277 (F). Kismayu ; (fl.), *Balladelli* 272 (F). Mogadishu to Amar Gegeb ; March 1913 (fl., fr.), *Paoli* 21 (F), 130 (F) (*typus* ; *P. rigida* Chiov.).

British Somaliland. 10° 14′ N., 48° 47′ E. ; Sept. 1929 (fl.), *Collenette* 56. Biyu Arnot, 10° 32′ N., 42° 42′ E. ; Nov. 1932 (fl.), *Gillett* 4661. Hargeisa, 9° 33′ N., 44° 01′ E. ; Sept. 1932 (fl.), *Gillett* 4050. La Farug ; May 1949 (fl.), *Bally* 7201.

Kenya Colony. Kiunga, on the coast, N.F.D. ; Nov. 1946 (fl.), *Bally* 5952. Ijara to Garissa ; Jan. 1943 (fl.), *Bally* 2086. Ngare-nyero ; Sept. 1944 (fl., fr.), *Bally* 3607. Dandu, Northern Province ; March 1952 (fl.), *Gillett* 12644 (with material in spirit) ; Mwachi, 3 mls. south of Mazeras, about 50 m., Kwale District, in shrub thicket fringing a seasonal watercourse in dry valley near coastal inlet ; Sept. 1953 (fl.), *Drummond and Hemsley* 4248.

Tanganyika Territory. Kisiwani, S. Pares District ; Feb. 1936 (fl.), *Greenway* 4554. Shinyanga ; Nov. 1938 (fl.), *Koritschoner* 2269. Gonja ; Jan. 1950 (fl.), *Bally* 7693. Bushiri, Pangani District ; Dec. 1950 (fl.), *Faulkner* 734, Pangani ; *Stuhlmann* I. 809 (*typus* ; *P. fasciculatum* K. Schum.). Mkomazi river, on road between Mkomazi and Buiko, Lushoto District, 460 m. ; April 1953 (fl.), *Drummond and Hemsley* 2310. Tanga Bay, uncommon, growing with *Derris trifoliata* over *Sueada monoica* bush in *Avicennia marina* mangrove stand towards the landward margin ; " twining fleshy perennial climber with inconspicuous small green flowers " ; Nov. 1947 (fl.), *Brenan and Greenway* 8305.

Strobopetalum *N. E. Br.*

This genus is only doubtfully distinct from *Pentatropis*, from which it differs in its campanulate corolla-tube and long strap-shaped corolla-lobes. Oliver (1895) considered that Brown's *S. carnosum* was scarcely distinct from *S. bentii* and although there is no further material available at Kew from Arabia, I can see no reason for maintaining two species.

Strobopetalum bentii *N. E. Br.* in Kew Bull. 1894, 336 (1894) ; Defl. Asclep. Arab. Trop. in Mém. Inst. Egypt. **3** (2), 259 (1896) ; Schwartz, Fl. Trop. Arab. in Mitt. Inst. Bot. Hamburg, Festschr. Winkler, **10,** 189 (1939).

S. carnosum N. E. Br. l.c. 390 ; Oliv. in Hook. Ic. Pl. t. 2387 (1895) ; Schwartz, *l.c.*

This species has been recorded hitherto only from southern Arabia ; the following specimen constitutes the first record from tropical Africa.

British Somaliland. Elayu ; March 1937 (fl.), *Peck* 12 (with material in spirit).

Cynanchum *Linn.*

Cynanchum somaliense (*N. E. Br.*) *N. E. Br.* ; Bullock in Kew Bull. **1953,** 356 (1953).

I have already (*l.c.*) recorded this species from Kenya Colony ; the following records extend its distribution into Uganda and Tanganyika, and it seems probable that its actual range is much like that of *C. validum* N. E. Br. and *C. hastifolium* N. E. Br. (see Bullock, *l.c.*).

Uganda. Namunyoro, Buvuma ; *Maitland* (comm. *Liebenberg*) 1190.

Tanganyika Territory. Igalukiro, Nassa, Mwanza District, Lake Province, 3800 ft., on hard-pan soil ; " prostrate creeper ; flowers yellow, aromatic ; sap profuse, milky " ; July 1953 (fl.), *Tanner* 1597.

Cynanchum longipes *N. E. Br.* in Kew Bull. **1897,** 273 (1897), et in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 393 (1903) ; Hutch., et J. M. Dalz. Fl. W. Trop. Afr. **2,** 54 (1931).

The following new records extend the distribution of this species to East Africa. Hutchinson and Dalziel (*l.c.*) recorded it from Sierra Leone and Nigeria.

Liberia. Gbanga, at the edge of original forest ; " calyx greenish-yellow, corolla rosolane-purple, latex milky " ; 1926 (fl.), *Linder* 653.

Belgian Congo. Lilando ; Aug. 1938 (fl.), *Louis* 10843.

Uganda. Kajansi Forest, Entebbe Road, 3900 ft., in forest undergrowth ; "climbing and scrambling to 5–6 ft., handsome flowers, greenish outside, yellow inside, central column deep reddish-purple " ; July 1935 (fl.), *Chandler* 1267.

Diplostigma *K. Schum.*

Diplostigma canescens *K. Schum.* ; Bullock in Kew Bull. **1954,** 372 (1954).

[*Periploca aphylla* (non Decne.) ;—Hutch. et Bruce in Kew Bull. **1941,** 144 (1941).]

In my previous note I recorded a northward extension of the known distribution of this species to the northern frontier of Kenya Colony,

where it was recently (1952) collected by my colleague Mr. J. B. Gillett. The Somaliland specimen collected by Mr. Gillett almost exactly twenty years earlier was wrongly identified by Dr. Hutchinson and Miss Bruce, partly because Mr. Gillett had himself confused it in the field with *Socotora visciformis* (Vatke) Bullock (see p. 266), and partly because as a sterile specimen it was almost unidentifiable (there was at the time no material of *Diplostigma* at Kew). The fairly dense crisped indumentum of the stem of *Diplostigma canescens* is, however, very characteristic, whereas the stems of *Periploca aphylla* Decne. are quite glabrous. A further Kenya specimen has also come to hand.

British Somaliland. Above Biyu Suldan, Libah Mele Mt., 5000 ft., 10° 20′ N., 43° 00′ S., in gorge, in shade of limestone rocks ; " specimen from shade showing the leaves which are usually absent "* ; Dec. 1932 (sterile), *Gillett* 4698.

Kenya Colony. Lokitaung, 3000 ft., Turkana Province, in undulating rocky country with scrub ; " flowers yellow " ; May 1953 (fl.), *Padwa* 210.

Marsdenia *R. Br.*

Marsdenia latifolia (*Benth.*) *K. Schum.* ; Bullock in Kew Bull. **1954,** 365 (1954).

M. gazensis S. Moore in Journ. Bot. **46,** 306 (1908).

A further new record for this widely distributed species has been found in the herbarium of the Imperial Forestry Institute, Oxford, and the reduction of *M. gazensis* reveals its presence in Southern Rhodesia.

Northern Rhodesia Near Samfya Mission, Lake Bangweolo, Fort Rosebery District, in swamp forest ; " slender climber with greenish-yellow flowers ". Sept. 1952 (fl.), *Angus* 360.

Leptadenia *R. Br.*

Robert Brown (Mem. Wern. Nat. Hist. Soc. **1,** 34 : 1809) remarked that he had examined three species of this genus in the Banksian herbarium, from the East Indies and tropical Africa, all of which were undescribed. Decaisne (1838, 1844) listed and described no fewer than thirteen species,—nine of them " *Frutices volubiles foliosi* " and the other four " *Fruticès erecti* ". The second group is now regarded as a single species, *L. pyrotechnica* (Forssk.) Decne. (hitherto often known as *L. spartium* Wight et Arn.), and I have reduced the first group to three.

The group of leafy species has usually been regarded as including three widely distributed species—*L. reticulata* (Retz.) Wight et Arn. from India, *L. arborea* (Forssk.) Schweinf. [hitherto usually known as *L. heterophylla* (Del.) Decne.] from Arabia and the northern semi-arid zone of tropical Africa, and *L. hastata* (Pers.) Decne. [hitherto known as *L. lancifolia* (Schum. et Thonn.) Decne.] from Mauretania eastwards through a similar semi-arid zone to Ethiopia and northern Kenya. These three account for seven of Decaisne's (1844) leafy species ; the remaining two he described from Madagascar with the names *L. madagascariensis* and *L. bojeriana*, the latter with the very definite habitat note " *. . . in arenosis maritimis ad oram occid. insulae Madagascar in sinu Sti. Augustini (cl. Bojer)* ", but I cannot distinguish them from *L. reticulata*. They were discussed at some length by Choux (1914).

* This is the reference to *Socotora visciformis* noted above.—A.A.B.

All these form a complex in which it is not easy to define the taxa with any certainty ; the vegetative parts are sufficiently similar to make it impossible to differentiate species by their use, and there seem to be no usable differences in the follicles, though those of *L. arborea* are on the whole somewhat smaller and less woody than those of *L. reticulata* and *L. hastata*. There is no fruiting specimen at Kew from the Mascarene Islands. The only constant character by which I have been able to separate the Indian *L. reticulata* from the African and Arabian *L. arborea* lies in the relative length of the calyx and corolla. Absolute measurements do not give a true picture, but in *L. reticulata* the calyx is longer than the corolla-tube whilst in *L. arborea* the calyx is shorter than the corolla tube. On this basis, the Mascarene material at Kew falls into *L. reticulata*. The other African species, *L. hastata*, is distinguished from both by its much larger (4–5 mm. against 2–2·5 mm. long corolla-lobes) flowers.

The additional character noted by Brown in the *Flora of Tropical Africa* (1903)—corolla lobes densely bearded inside with long jointed hairs for *L. hastata*, against corolla lobes pubescent inside, is not easy to use on account of great variation in *L. arborea*, where the pubescence of the inner face of the corolla-lobes frequently might be described as "densely bearded with jointed hairs".

Examination of the distribution of this complex shows that the area of *L. arborea* to some extent overlaps that of *L. hastata* but is on the whole more northerly and extends into Egypt* and Arabia whilst *L. hastata* is confined to the African continent and reaches southward into Uganda and northwestern Kenya, but does not extend further to the east than southern Ethiopia. *L. reticulata* has a wide distribution in India from the upper Gangetic Plain to Bombay and Madras and extends into Ceylon in the south and into Burma in the north-east, whilst as stated above it appears to occur also in the Mascarene Islands in Mauritius, Comoro Islands and Madagascar itself. The habitat in all cases is dry savannah or sandy coastal strands, with rains alternating seasonally with long, hot, dry periods.

I am in some doubt as to whether the three taxa are worthy of specific status ; certainly they are not so readily distinguishable from each other as is *L. pyrotechnica* from all three and with this in view they could reasonably be regarded as subspecies derived from a single species which at one time had a continuous distribution covering Africa, parts of the Orient and India and perhaps extending far beyond the limits of the three species now recognised.

The following key serves for species-recognition :—

Erect, leafless shrubs, or with a few linear, very soon deciduous leaves . . *L. pyrotechnica*

Twining shrubs with broad, well-developed, persistent, petiolate leaves :
Corolla-lobes 4–5 mm. long ; calyx longer than the corolla-tube . . *L. hastata*

Corolla-lobes 2–2·5 mm. long :
Calyx shorter than the corolla-tube . . . . . *L. arborea*

Calyx longer than the corolla-tube . . . . . *L. reticulata*

* This is represented at Kew by a specimen collected by *P. H. Davis* (No. 6008B at Soluga Is., Assuan in December, 1943.—A.A.B.

Leptadenia pyrotechnica *Forssk. Decne.* in Ann. Sc. Nat. Sér. 2, **9,** 270 (1838), et in DC. Prodr. **8,** 629 (1844) ; Boiss. Fl. Or. **4,** 63 (1879) ; Deflers, Voy. Yemen, 166 (1889), et Asclep. Arab. Trop. in Mém. Inst. Egypt. **3,** 261 (1896) ; K. Schum. in Engl. et Prantl, Naturl. Pflanzenfam. **4** 2, 269, 270, ff. 79 A, D (1895) ; et in Ann. Istit. Bot. Roma, **7,** 41 (1898) ; Muschler, Man. Fl. Egypt. **2,** 755 (1912) ; Diels in Engl. Bot. Jahrb. **54,** Beibl. No. 120, 110 (1917) ; Blatter, Fl. Arab. in Rec. Bot. Surv. India, **8,** 300 (1921) ; Chiov. Fl. Somala, **1,** 221 (1929) ; Post, ed. Dinsmore, Fl. Syria, Palest. Sinai, **2,** 196 (1933) ; Schwartz, Fl. Trop. Arab. in Mitt. Inst. Bot. Hamburg, Festschr. Winkler, **10,** 191 (1939) ; Corti, Fl. Veg. Fezzan, 213 (1942) ; Parsa, Fl. Iran. **4** 1, 71 (1949) ; Maire et Monod in Mém. Inst. Franç. Afr. Noire, No. 8, 48 (1950).

Cynanchum pyrotechnicum Forssk. Fl. Aeg.-Arab. 53 (1775) ; Del. Descr. Egypt. Hist. Nat. **2,** 54, t. 20, f. 3 (1812).

Sarcostemma pyrotechnicum Forssk. Schultes in Roemer et Schultes, Syst. Veg. **6,** 116 (1820).

Microloma pyrotechnicum Forssk. Spreng. Syst. Veg. **1,** 855 (1825).

Leptadenia spartium Wight et Arn. Contrib. Bot. India, 48 (1834) ; Decne. in DC. Prodr. **8,** 629 (1844) ; Hook. f. Fl. Brit. Ind. **4,** 64 (1883) ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** 1, 432 (1903) ; Hutch. et J. M. Dalz. Fl. W. Trop. Afr. **2,** 63 (1931) ; Hutch. et Bruce in Kew Bull. **1941,** 148 (1941) ; Parsa, *l.c.*

L. jacquemontiana Decne. in Ann. Sc. Nat. Sér. 2, **9,** 270 (1838), et in DC. Prodr. **8,** 629 (1844) ; Stocks ex Hook. f. in Hook. Ic. Pl. t. 838 (1852).

L. gracilis Decne. *l.c.* 269 et *l.c.* ; K. Schum. in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 269, 270 (1895).

L. pyrotechnica is a plant of hot arid rather than semi-arid areas and occurs from Mauretania eastwards through the French Sudan, the extreme north of northern Nigeria and Oubangui-Chari to Kordofan and Egypt, Eritrea and Somaliland, and from Arabia and Palestine eastwards to Baluchistan, and Sind. Throughout this great area it shows little morphological variation ; its rather small linear leaves have been but rarely collected and they evidently wither and die very soon after they appear.

Leptadenia hastata *Pers. Decne.* in DC. Prodr. **8,** 551 (1844) ; Vatke in Linnea, **40,** 217 (1876) ; K. Schum. in Engl. Pflanzenw. Ost Afr. **C,** 327 (1895), et in Engl. et Prantl, Naturl. Pflanzenfam. **4** 2, 269, 270, ff. 79 E–F (1895).

Cynanchum hastatum Pers. Syn. Pl. **1,** 273 (1805).

C. lanceolatum Poir. Encycl. Suppl. **2,** 430 (1811) ; Schultes in Roemer et Schultes, Syst. Veg. **6,** 111 (1820).

C. lancifolium Schum. et Thonn. Beskr. Guin. Pl. 150 (1827) *.

C. scabrum Schum. et Thonn. *l.c.* 152.

* The date on the title-page ; some authorities consider that the actual date of publication could not be earlier than 1829.—A.A.B.

Tylophora incana Brunner in Flora, **23** (2), Beibl. 26 (1840) ; Walp. Repert. **6,** 491 (1847)*.

Leptadenia lancifolia (Schum. et Thonn.) Decne. in Ann. Sc. Nat. Sér. 2, **9,** 269 (1838), et in DC. Prodr. **8,** 628 (1844) ; Benth. in Hook. Niger Fl. 456 (1849) ; A. Rich. Tent. Fl. Abyss. **2,** 44 (1851) ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 430 (1903) ; Hutch. et J. M. Dalz. Fl. W Trop. Afr. **2,** 63 (1931) ; Maire et Monod in Mém. Inst. Franç. Afr. Noire, No. 8, 48 (1950).

L. lancifolia var. *scabra* Decne. in DC. Prodr. **8,** 628 (1844).

L. cordata Hochst. ex Decne. *l.c.* in syn.

There seems to be no good reason to doubt the correctness of Decaisne's (1838) identification of Persoon's African plant with that of Schumacher and Thonning, in spite of the somewhat unreliable statement that the flowers of the former are subsessile. The term subsessile could very well refer rather to the umbellate arrangement of the flowers, in contrast to the racemiform arrangement in some species of *Cynanchum*. I have therefore restored the name used by Vatke and by K. Schumann. Decaisne (1844) first referred *Cynanchum lanceolatum* Poir. (a mere illegitimate name-change for *C. hastatum* Pers.) to *Leptadenia hastata* in his list of *Species exclusae* under *Cynanchum*, but in his treatment of *Leptadenia* he adopted his own earlier (1838) specific name but cited both *Cynanchum hastatum* and *C. lanceolatum* in synonymy, as he had also done in 1838, when his adoption of *L. lancifolia* was due to the alleged prior existence of " *Leptadenia lanceolata* Wight ", a name which I have been unable to trace.

Leptadenia arborea (*Forssk.*) *Schweinf.* Arab. Pflanzennamen, 167 (1912) ; Blatter, Fl. Arab. in Rec. Bot. Surv. India, **8,** 298 (1921) ; Schwartz, Fl. Trop. Arab. in Mitt. Inst. Bot. Hamburg, Festschr. Winkler, **10,** 191 (1939).

Cynanchum arboreum Forssk. Fl. Aeg. Arab. 53 (1775).

C. heterophyllum Del. Cent. Pl. Afr. Voy. Meroe, 47, t. 63, f. 4 (1826).

L. forskalii G. Don. Gen. Syst. **4,** 124 (1837) ; Decne. in Ann. Sc. Nat. Sér. 2, **9,** 269, t. 10, f. B (1838), et in DC. Prodr. **8,** 628 (1844) ; A. Rich. Tent. Fl. Abyss. **2,** 45 (1851) ; Vatke in Osterr. Bot. Zeitschr. **26,** 146 (1876).

Leptadenia heterophylla (Del.) Decne. in Ann. Sc. Nat. Sér. 2, **9,** 270 (1838), et in DC. Prodr. **8,** 628 (1844) ; K. Schum. in Ann. Istit. Bot. Roma, **7,** 41 (1898) ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 432 (1903) ; Muschler, Man. Fl. Egypt, **2,** 755 (1912) ; Hutch. et J. M. Dalz. Fl. W. Trop. Afr. **2,** 63 (1931) ; Hutch. et Bruce in Kew Bull. **1941,** 148 (1941) ; Maire et Monod in Mém. Inst. Franç. Afr. Noire, No. 8, 48 (1950).

L. abyssinica Decne. in DC. Prodr. **8,** 628 (1844) ; A. Rich. *l.c.*

L. delilii Decne. *l.c.*

L. clavipes S. Moore in Journ. Bot. **50,** 364 (1912).

L. pallida Hochst. in Flora, **27,** 101 (1844), nomen.

* Walpers actually cited " *T. syringaefolia* Spruner " and the page number " 27 " Brunner mentioned *T. syringifolia* E. Mey. on p. 27 in the course of his discussion—A.A.B.

L. schimperiana Hochst. *l.c.*, nomen.

Secamone Alpino, Pl. Aegypt. 53, cum. fig. (1592), non *Secamone alpini* Schultes, nec *Oxystelma alpini* Decne.

Schweinfurth (1912) published the combination *Leptadenia arborea* with a reference to the synonym *L. abyssinica* ; it has been omitted from the *Index Kewensis* and the first definite association of the name with *L. heterophylla* was by Blatter (1921) and later by Schwartz (1939). In works on tropical Africa the species has, at least since the publication of Brown's synonymy in the *Flora of Tropical Africa* (1903), always been known as *L. heterophylla*. Certainly the plant is extremely heterophyllous, a character which it shares with *L. hastata*.

Leptadenia reticulata (*Retz.*) *Wight et Arn.* Contrib. Bot. India, 47 (1834) ; Wight, Ic. Pl. Ind. Or. t. 350 (1840) ; Decne. in DC. Prodr. **8,** 628 (1844) ; Dalzell et Gibson, Bombay Fl. 152 (1861) ; Hook. f. Fl. Brit. India, **4,** 63 (1883) ; Trimen, Handb. Fl. Ceylon, **3,** 164 (1895) ; Dalgado, Fl. Goa, 124 (1898) ; Cooke, Fl. Bombay, **2,** 172 (1904) ; Haines, Trees, Shrubs, Econ. Herbs Centr. Prov. 156 (1916), et Bot. Bihar Orissa, 561 (1922) ; Lace, List Trees, Shrubs, etc. Burma, ed. 2 (Rodger), 117 (1922) ; Gamble, Fl. Madras, **2** (5), 850 (1924).

Cynanchum reticulatum Retz. Obs. Bot. **2,** 15 (1781) ; Willd. Sp. Pl. **1,** 1258 (1798) ; Schultes in Roemer et Schultes, Syst. Veg. **6,** 107 (1820).

Secamone canescens Sm. in Rees, Cycl. **32,** no. 3 (1819).

Cynanchum ovatum Alner [Thunb.] Obs. Cynanchum, 6 (1821).

Asclepias suberosa Roxb. Fl. Ind. **2,** 38 (1832).

Leptadenia imberbis Wight et Arn. *l.c.* 48 ; Decne. in DC. Prodr. **8,** 628 (1844).

L. appendiculata Decne. *l.c.*

L. madagascariensis Decne. *l.c.* ; Choux in Ann. Mus. Col. Marseille, Sér. 3, **2,** 421 et seqq., tt. 43–44 (1914).

L. bojeriana Decne. *l.c.* ; Choux, *l.c.*

Cynanchum indicum Burm. ex DC. *l.c.* in syn.

Asclepias zeylanica Burm. ex DC. *l.c.* in syn.

A. javanica Burm. ex DC. *l.c.* in syn.

Leptadenia brevipes Wight, Cat. no. 1536 (1834), nomen.

Cynanchum asthmaticum Buch.-Ham. ex Hook. f. Fl. Brit. India, **4,** 63 (1883), in syn.

Asclepias volubilis Herb. Madr. ex Hook. f. *l.c.* in syn.

Gymnema aurantiacum Wall. ex Hook. f. *l.c.* in syn.

Ridley, Fl. Malay Penins. **2,** 410 (1923), states that the Malayan records for this species are due to erroneous localization of specimens ; their exclusion certainly removes an anomaly from an otherwise reasonable distribution, which is, however, somewhat disturbed by the appearance of the plant in Burma to the north-east and the Mascarene Islands to the south-west. The existence of the plant in Malaya would involve exposure to an entirely different climate, whilst as understood here it is confined to areas of very similar climate (see p. 288).

SPECIES DUBIAE VEL EXCLUSAE

Leptadenia cymosa G. Don, Gen. Syst. **4,** 124 (1837) ; I have been unable to identify this " East Indies " plant, and the name should be regarded as a *nomen nudum.* The only description given is " flowers cymose ; perennial herbaceous twiner ". This is sufficient to exclude it from *Leptadenia,* but insufficient for identification.

Leptadenia elliptica Blume, Bijdr. 1066 (1826), is **Secamone blumei** Decne. in DC. Prodr. **8,** 501 (1844), a plant of the Malayan archipelago [not *S. elliptica* R. Br. (1810)].

Leptadenia ephedriformis Defl. Voy. Yemen, 166 (1889), is **Socotora visciformis** (*Vatke*) *Bullock, antea,* p. 266.

Leptadenia visciformis Vatke in Oesterr. Bot. Zeitschr. **26,** 146 (1876), is **Socotora visci formis** (*Vatke*) *Bullock, antea,* p. 266.

Rice : a second helping.*—The first edition of this book on the world's most widely-grown cereal was hailed in this journal (Kew Bull. 1953. 544) as most opportune, and the issue of a second edition within two years is indication of the welcome it has widely received. In his preface to the second edition the author says he has taken the opportunity to consider the criticisms made by reviewers and to make some corrections in the text, but the alterations are in fact few, and the second edition differs little from the first. Of the two botanical matters criticised in the Kew Bulletin, one, the author's rather muddled description of the spikelet, remains unimproved, but the second, the account of species of *Oryza* and the origin of rice, has been amended in part.

However the botany of rice has a minor part in this work which is primarily a book for the agriculturist. Here the reader will find a clear and full account of the conditions necessary for successful growing of rice, the characteristics of the plant and its varieties, its food requirements, the methods of cultivation followed in various countries, its pests and diseases, and production, preparation, and use in the different continents.

Rice in the author's view is the most remarkable of crops, and few will argue with him who have seen it grown successfully as a crop of dry land and also ripening its ears on estuarine mud flooded for several hours each day by tidal waters. As remarkable is its adaptability to different systems of cultivation. Most of the world's rice is grown by methods unchanged for centuries, and the traveller can see it being harvested tediously stalk by stalk with the aid of a small knife. Yet elsewhere, if he travels far enough, he may see mechanization developed to the greatest extent and even the aeroplane brought in to scatter the seed over the wide fields of California. All these things and many others are described in the book which can be heartily recommended to anyone interested in the crop. Not even those to whom rice makes no appeal can fail to be enthralled by the illustrations from many lands which are an attractive feature of this useful book.

T. A. RUSSELL.

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* Rice, by D. H. Grist. pp. 333 with 68 photographs and 34 text-figures. 2nd edition, 1955. Longmans, Green & Co., London, New York, and Toronto. Price 35/-.

A NEW SYZYGIUM FROM SAMOA.

R. Melville

In his discussion of *Syzygium brevifolium* (A. Gray) C. Muell., Christophersen (B.P. Bishop Museum Bull. 154, 22, 1938) mentioned his collection of two sterile specimens differing in leaf characters from that species. At the same time he stated that they were identical with another sterile specimen, Reinecke No. 370, in the Kew Herbarium, which had been referred to *Memecylon* in the *Melastomataceae*. This Reinecke specimen came from the central range on Savaii at 1500 m., collected in June 1894. There are two others without number or documentation beyond the words ' Samoa ' and ' Reinecke '. One of these is similar to No. 370 and the other had been referred, correctly, to *S. brevifolium*. The two plants can be distinguished readily in the vegetative state by the presence of numerous pellucid glands on the leaves of *S. brevifolium*, which are absent from the other.

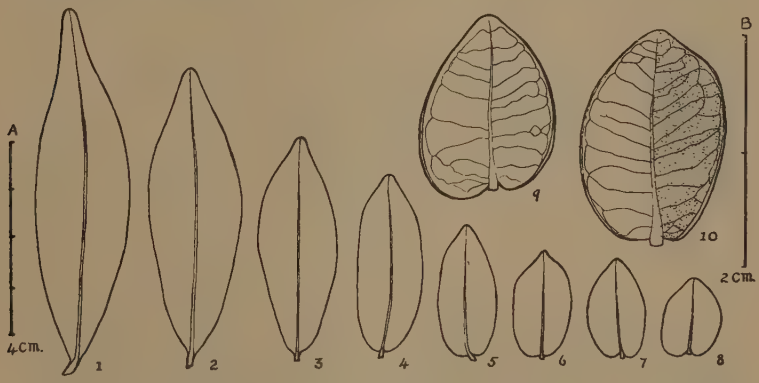

Fig. 1. Gerontic leaf spectrum of *Syzygium hebephyllum* Melville ; 1–8 ; 1 from a sapling 3 m. high ; 2, 3 from a sapling 2 m. high ; 4–6 from a sapling 6 m. high ; 7, 8, from adult trees—all from Afiamalu, Upolu, Samoa, coll. M. G. Irwin, 1954. 9, adult leaf of *S. hebephyllum* Melville enlarged for comparison with 10, adult leaf of *S. brevifolium* (A. Gray) C. Muell. (glands drawn on one half only), from Christophersen No. 118, Lanutoo, Upolu, Samoa, 8.8.1929. Scales : 1–8, A ; 9, 10, B.

Until recently, the innominate plant was represented in Herb. Kew. by the two Reinecke specimens and one of the two Christophersen collections —Christophersen and Hume No. 2082. An opportunity to obtain further material came in January 1954, with a request from Mr. M. G. Irwin, Principal of the Teachers' Training College at Apia, Western Samoa, for the identification of a *Syzygium* similar to *S. brevifolium*. It is entirely due to his willing co-operation in collecting flowers, fruits and a range of foliage specimens that I am now able to describe this rare tree.

Syzygium hebephyllum *Melville*, sp. nov., *S. brevifolio* (A. Gray) C. Muell. affine, sed ab eo foliis sessilibus haud glanduloso-punctatis, basi subcordatis, inflorescentia pauciflora et gemmis floriferis majoribus distinguendum.

Arbor parva usque 10 m. alta, cortice 1–2 mm. crasso, fusco-cinnamomeo, minute-rimoso et in laminas parvas exfoliato, ramulis glabris, quadrangularibus, eglandulosis. Folia juvenilia usque 8 cm. longa, lanceolata vel elliptico-lanceolata, apice acuta vel sub-acuminata, acuminibus rotundatis, basi cuneata, breve-petiolata ; folia intermedia 2–4 cm. longa, oblonga, apice obtusa, basi rotundata ; folia adulta decussata, 5–15-25 mm. longa, ovato-oblonga vel ovata, apice obtusa, acuminibus rotundatis, basi cordata vel subcordata, brevissime petiolata, laminis crassis, coriaceis, non glandulopunctatis interdum glandulis perpaucis instructa. Inflorescentiae terminales, 3–11 floribus ; gemmae florum 5–7 mm. diametro, subglobulares, basi rotundatae, pedicellis 1–2 mm. longis, pedunculis 2–7 mm. longis, bracteis caducis ; sepala et petala 4, imbricata, caduca ; stamina numerosa, 10 mm. longa, lactea ; stylus linearis, circiter 7 mm. longus ; ovarium loculo singulo fertile ; fructus subglobulares vel oblato-ellipsoidei, 17–27 mm. diametro, maturi lividi, sicci brunnei, cicatricibus circularibus calicium 8–9 mm. latis praeditus.

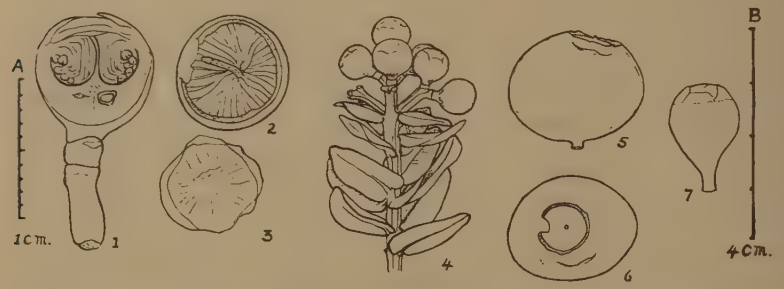

Fig. 2. *Syzygium hebephyllum* Melville : mature flower bud in section, 1 ; top of flower bud showing inflexed stamens and style, 2 ; caducous cap of sepals and petals from 2 3 ; tip of branch with inflorescence 4 ; fruit in lateral view 5, top view 6—all from Afiamalu, Upolu, Samoa, Coll. M. G. Irwin, 1954. Mature flower bud of *S. brevifolium* (A. Gray) C. Muell., 7, from Christophersen No. 118, Lanutoo, Upolu, Samoa, 8.8.1929, for comparison with 1. Scales : 1–3, 7, A ; 4–6, B.

Samoa : Upolu, on the lip of a canyon at Afiamalu, altitude 760 m., *M. G. Irwin*, flowers 3.12.1954 (Typus, in Herb. Kew.) fruit 25.4.1954 ; Savaii, above Matavanu, altitude 900 m., *E. Christophersen and E. P. Hume* 2082, 15.7.1931 ; Centralgebiet, 1500 m., *Reinecke* 370, June, 1894.

The material collected by Mr. Irwin came from a small isolated colony growing in forest on the lip of a canyon. There were two adult trees, 8 and 10 m. high respectively, their slender trunks covered in epiphytes, and three juvenile trees respectively 2, 3 and 6 m. high. The foliage of juveniles differs considerably in size and shape from that of adults and there is a gradual transition from juvenile to adult leaf forms. The gerontic leaf spectrum depicted in Fig. 1 : 1–8, shows the transition in leaves of different physiological age taken from corresponding positions about the mid-point of a season's growth on the trees of this colony. It may be noted that the fully adult leaf of *S. brevifolium* corresponds closely in general shape and in the shape of the leaf base with leaves of a more juvenile phase in *S. hebephyllum* (Fig. 1 : 10 and 6). The numerous

pellucid glands on the leaves of *S. brevifolium* (Fig. 1 : 10) distinguish vegetative specimens and in the reproductive phase it is distinguished from *S. hebephyllum* by the more numerous flowers of the terminal inflorescences and the smaller obovoid flower buds. (Fig. 2 : 4 ; 1 and 7). The flowering times of the two species differ. Both Christophersen and Rechinger collected *S. brevifolium* in flower in August and Reinecke collected sterile shoots of *S. hebephyllum* in June and Christophersen and Hume in July. On the evidence of the present collections, *S. hebephyllum* flowers in December at similar altitudes to those at which *S. brevifolium* grows.

Irving W. Bailey's Contribution to Plant Anatomy.*—Irving Widmer Bailey, Professor of Plant Anatomy and Chairman of the Institute for Research in General Plant Morphology at Harvard University, has been publishing papers on the anatomy of the higher plants for more than 40 years. His articles, many of which have been written in collaboration with a series of enthusiastic colleagues and students, are all of an exceptionally high standard, they are never dull, and collectively they constitute a major contribution to botanical knowledge. It may be noted that, during a large part of Bailey's career, plant anatomy has been a relatively unfashionable branch of botany, and one of his greatest services has been not only to keep the subject before our eyes, but to remind us that it is an aspect of botany that is still far from completely known.

The keynote to Bailey's many botanical writings is his profound interest in phylogeny, and in recent years he has been especially concerned with the study of tracheal tissue in relation to the phylogeny and taxonomy of certain families of angiosperms. He has dealt particularly with families which have retained unspecialized or primitive characteristics, such as lack of vessels in the secondary xylem, or the possession of long vessel members, often with scalariform perforation plates. He has also been concerned with certain aspects of floral anatomy in relation to phylogeny. Bailey, however, has repeatedly stressed in his writings that phylogenetic and taxonomic conclusions must be based on the totality of available evidence rather than on facts drawn exclusively from one part of the plant body. This broad minded approach, which might well be emulated by all those who enjoy making botanical excursions on specialized hobby horses, ensures that his work is of fundamental importance, and his conclusions will have to be carefully considered by all conscientious taxonomists who are interested in the basic and really significant problems of phylogeny and classification.

Phylogeny and classification are, however, by no means the only aspects of botany with which Bailey has been concerned, for he (with his associates) has published a whole series of papers on the cambium and its derivitive tissues, on the physical and chemical properties of cell

* Contributions to Plant Anatomy by Irving W. Bailey Sc.D. pp. xxiv + 259, 23 pls. and numerous text figures. Waltham Mss. U.S.A. Chronica Botanica Co. 1954. Price $7.50.

walls, and has explored the significance of certain wood destroying fungi in the enzymatic hydrolysis of cellulose. Other papers have been concerned with the identification of mezozoic coniferae and the preservative treatment of wood. The great breadth of his experience is further indicated by an important article on cöoperation in scientific research.

In view of the fact that more than 100 papers by Bailey and his associates are scattered in various journals, it is a great convenience to students of plant anatomy and taxonomy to have a selection of his most important articles taken from the journals in which they were originally published and brought together in a single well produced volume. The articles have been reprinted with but little change from the originals. The book also includes a bibliography, separate indexes to authors, subjects, and plants and animals. At the beginning of the book there is a revealing biographical sketch of the author written by F. S. Barghoorn, who tells us how, in his boyhood, Bailey's interest in living things was aroused by the rich experience of exploring the coastal lowlands, the eastern jungles, and the high mountains of Peru, when his father was in charge of the Harvard observatory at Arequipa. Interest is added to the book by a series of head pieces and vignettes, drawn by B. G. L. Swamy of Madras, India. These illustrations are most ingeniously built up from plant cells and tissues which form the basis of some of Bailey's writings. The book is a worthy monument to a botanist who is not only one of the most outstanding and far sighted anatomists of his generation, but also an able administrator and a man whose personality is greatly respected by all who come in contact with him.

C. R. Metcalfe.

A Guide to Wild Flowers.*—Attractive books on wild flowers appear annually in ever-increasing quantity, many of them dealing with the same limited number of species, in much the same chatty, imprecise way. The professional may scoff at such *trivialia*, but publishers know better, and it remains a fact that most people want to learn something about our native flora, without necessarily devoting themselves to the minute consideration of taxonomic problems :—" To be learned is too lofty an ambition for the greater number of us "—Miss Carey's quotation is appropriate, and some might add that, even in taxonomy, the dividing line between erudition and obscurantism is sometimes rather finely drawn.

This is a pleasant, unpretentious, little book ; the illustrations are good, and the text, though sometimes exasperatingly unprofessional, is probably better suited to the beginner than the esoteric jargon of the exact phytographer. Messrs. Dandy and Stearn have purged this edition of its worst imperfections, without in any way altering the style and appeal of the book ; those of us who have attempted similar tasks will know that such revision requires a considerable measure of restraint and understanding.

R. D. Meikle.

* Wild Flowers at a Glance, M. C. Carey and Dorothy Fitchew, 2nd edition, London, 1954. J. M. Dent and Sons Ltd., pp. xi + 276 ; price 15/- net.

NOTES ON CYPERACEAE : XXXVII*

E. Nelmes

Carices of the Tropical Pacific Islands, loosely called Polynesia.

The title of this paper covers the small islands lying to the east of Malaysia and having a somewhat similar general direction from north-west to south-east, from the Mariana or Ladrone Islands and the Caroline Islands to the Tubuai or Austral Islands, as the Malaysian area, consisting of much larger land masses, which stretch from Sumatra to New Guinea.

This account completes a series of revisions of *Carex* in this part of the world. The others deal with the species in Japan, including Korea and Formosa, by J. Ohwi (Mem. Coll. Sci. Kyoto Imp. Univ., Ser. B, 11 : 229–530, tt. VI–XV : 1936) ; Indo-China, including Thailand and Lower Burma, by the writer, now being published ; Hawaii, by R. W. Krauss (Pacific Science, 4 : 249 282, figs. 1–21 : 1950) ; and Malaysia, by the writer (Reinwardtia, 1 : 221–450 : 1951).

It will be noted that the two largest groups of *Carices* in Polynesia are Subgen. *Indocarex* Baill. (5 species) and Subgen. *Carex*, Sect. *Acutae* Fries (6 species and 1 variety). Of the remaining 4 species, 3 belong to three different sections of Subgen. *Carex*, and the remaining 1 is the sole representative of Subgen. *Vignea* Nees in Polynesia. The comparatively large element of *Indocarex* is to be expected, seeing that the area lies almost wholly within the tropics. It is different, however, with the still larger group belonging to the *Acutae*, for this is a group which is best represented in temperate countries, though its *Polynesian* species belong to what one believes to be the most primitive section of the group. It is a striking fact that these six species are all isolated from one another, every one occurring on a different island or group of islands. Surely a most interesting phylogenetic story lies hidden here ! Maybe, when this section was originally spreading, there was a more continuous land area in this region, later to split up and its flora to become more differentiated.

This revision is based on specimens in the B. P. Bishop Museum, Honolulu, and in the Paris Herbarium, kindly loaned to Kew by the respective authorities, and supplemented by material in the Kew Herbarium.

There has been no previous separate account of the *Carices* of the Pacific Islands. The most important general writings on the Islands and their vegetation are by F. B. H. Brown, the author of several *Carices* in Sect. *Acutae*, mostly published in the " Bulletin of the Bernice P. Bishop Museum ". A list of New Caledonian *Carices* appeared in Guillaumin's " Catalogue des Plantes Phanérogames de la Nouvelle—Calédonie " (Ann. Mus. Col. Marseille, 19 : 53 -54 : 1911).

The Genus *Carex* in the Tropical Pacific Islands.

Subgen. 1. **Indocarex** *Baill.*

Sect. 1. **Scabrellae** *Kükenth.*

1. *Carex oligostachya* Nees ex Hook. Solomon Is. : Buka. India, Indo-China, Malaysia.

* Continued from K.B. 1955 : 92 (1955).

Sect. 2. **Stramentitiae** (*C. B. Clarke*) *Nelmes.*

2. *C. dietrichiae* Boeck. Caroline Is. : Palau ; Fiji Is. ; New Caledonia. Queensland, Malaysia.
3. *C. fissilis* Boott. New Caledonia.
4. *C. fuirenoides* Gaudich. Mariana Is. or Ladrones : Guam.

Sect. 3. **Filicinae** (*C. B. Clarke*) *Nelmes.*

5. *C. neohebridensis* Guillaum. et Kükenth. New Hebrides.

Subgen. 2. **Carex.**

Sect. 4. **Decorae** (*Kükenth.*) *Ohwi.*

6. *C. gibbsiae* Rendle. Fiji Is. : Viti Levu.

Sect. 5. **Graciles** *Tuckerm.*

7. *C. brunnea* Thunb. Caroline Is. : Palau ; New Caledonia. India, China, Japan, Queensland.

Sect. 6. **Anomalae** *Carey.*

8. *C. neurochlamys* F. Muell. New Caledonia ; Samoa Is. Australia.

Sect. 7. **Longispicae** *C. B. Clarke.*

9. *C. feani* F. B. H. Brown. Marquesas Is. : Hivaoa.
10. *C. stokesii* F. B. H. Brown. Tubuai Is. or Austral Is. : Rapa.
    var. *aristata* F. B. H. Brown. Rapa.
11. *C. tahitensis* F. B. H. Brown. Society Is. : Tahiti.
12. *C. savaiiensis* Kükenth. Samoa Is. : Savaii.
13. *C. inverso-nervosa* Nelmes. New Caledonia.
14. *C. graeffeana* Boeck. Fiji Is. : Ovalau, Viti Levu ; Samoa Is. : Savaii ; Cook Is. : Rarotonga.

Subgen. 3. **Vignea** *Nees.*

Sect. 8. **Paniculatae** *Kunth.*

15. *C. appressa* R. Br. New Caledonia. New Guinea, Australia, New Zealand.

Carex *Linn.**

Key to the Subgenera of *Carex.*

1. Cladoprophylls absent. Spike bisexual, sessile. Stigmas 2, very rarely 3 . . . . . 3. *Vignea*

1. Cladoprophylls present. Spikes bisexual or unisexual, often peduncled. Stigmas 3, much less often 2 :

* For a generic description of *Carex* see Reinwardtia, 1 : 232 (1951).

2. Cladoprophylls utriculiform, visible. Spikes bisexual, sessile or subsessile . . . . . 1. *Indocarex*

2. Cladoprophylls ocreiform, usually hidden in bract-sheaths. Spikes usually unisexual, often peduncled . . . . 2. *Carex*

Subgen. 1. **Indocarex** Baill.

Spikes androgynaeceous, usually short and numerous, rarely few, sessile or subsessile, usually in panicles. *Cladoprophylls* utriculiform, visible. *Utricles* more or less trigonous. *Stigmas* 3.

Subgen. 2. **Carex** (*Eucarex* Coss. et Germ.).

Spikes usually unisexual, sometimes bisexual, often long, several, rarely 1 or numerous, often peduncled, usually solitary, sometimes fascicled, simple, rarely compound at the base, often longly spaced from one another. *Cladoprophylls* ocreiform, usually hidden in bract-sheaths, apparently becoming vestigial. *Utricles* more or less trigonous or, much less frequently, plano-convex or biconvex. *Stigmas* 3, much less often 2.

Subgen. 3. **Vignea** (P. Beauv.) Nees.

Spikes bisexual (androgynaeceous or gynaecandrous), very rarely unisexual or dioecious, short, several to numerous, rarely 1, sessile, usually aggregated, contiguous, or approximate, in a spicate inflorescence. *Cladoprophylls* absent. *Utricles* plano-convex or biconvex. *Stigmas* 2, very rarely 3.

Artificial Key to the Polynesian Species of *Carex*.

1. Stigmas 3 ; utricles and achenes trigonous :

2. Spikes 5–6, single at nodes, terminal male, lateral female or upper with a few apical male flowers ; utricles ferrugineous-papillose 8. *C. neurochlamys*

2. Spikes more numerous, usually much more numerous, in fascicles or panicles, all androgynaeceous ; utricles not ferrugineous-papillose :

3. Spikes 2·5–3·5 cm. long, fascicled . . . . . 6. *C. gibbsiae*

3. Spikes 4–15 mm. long, panicled :

4. Stems lateral ; leaves 2–5 mm. wide ; lower bracts usually shorter than their panicles ; utricles subinflated-trigonous, often sparsely hispidulous above . . . 1. *C. oligostachya*

4. Stems central ; leaves 4–11 mm. wide ; lower bracts longer than the whole inflorescence ; utricles glabrous :

5. Leaves about 4 mm. wide ; secondary panicles 10 and more, binate ; utricles distinctly trigonous 5. *C. neohebridensis*

5. Leaves 5–11 mm. wide ; secondary panicles 3–8, single :

6. Utricles 2·75–3 mm. long, margins vitreous-hispid ; achenes oblong-obovoid to ellipsoid . 4. *C. fuirenoides*

6. Utricles 3·5–5 mm. long, margins glabrous ; achenes ellipsoid or rhomboid-ellipsoid :

7. Female glumes often oblong, apex usually truncate-rotund or bilobed-emarginate, 2–3·5 mm. long ; utricles subinflated-trigonous . . 2. *C. dietrichiae*

7. Female glumes ovate, apex subacute to obtuse, 1·5–2 mm. long ; utricles distinctly trigonous . 3. *C. fissilis*

1. Stigmas 2 ; utricles and achenes plano-convex or biconvex :

8. Spikes numerous or very numerous, 4–8 mm. long, sessile 15. *C. appressa*

8. Spikes 0·7–20 cm. long (1–20 cm. long, except in *C. brunnea*, 0·7–4·5 cm. long), at least the lower peduncled, usually longly or very longly peduncled :

9. Spikes in 4–8 fascicles, 1–5 in each fascicle ; lower bracts longly upper rather longly to scarcely sheathing ; utricles whitish-setulose . . . . . 7. *C. brunnea*

9. Spikes single at nodes ; bracts usually not but lowest sometimes sheathing ; utricles glabrous :

10. Spikes 15–27 ; female glumes 1·4–2·5 mm. long ; utricles 1·8–2·5 mm. long . . . . . 14. *C. graeffeana*

10. Spikes 4–12 ; female glumes 2–4 mm. long ; utricles 3–5 mm. long :

11. Upper 1–3 spikes male :

12. Spikes about 12, 4–20 cm. long, female part of spike about 1 cm. thick ; utricles obovate, about 5 mm. long 10. *C. stokesii*

12. Spikes 5–8, 1·25–5·5 cm. long, female part of spike 4–7 mm. thick ; utricles elliptic or more or less lanceolate, 3·25–4·5 mm. long :

13. Male spike 1 ; utricles 3·5–4·5 mm. long, 1·25–1·5 mm. broad (uppermost spike always male) 12. *C. savaiiensis*

13. Male spikes 1–3 ; utricles 3·25–3·5 mm. long, 1·75–2·25 mm. broad (upper spikes sometimes androgynaeceous) . . . . . 13. *C. inverso-nervosa*

11. Upper and usually lower spikes androgynaeceous :

14. Leaves 8–12 mm. wide ; spikes 8–9, 5·5–13 cm. long :

15. Spikes 8–13 cm. long, female part 6–8 mm. thick ; utricles 3·25–3·75 mm. long, obovate but tapering below . . . . . 10. *C. stokesii* var. *aristata*

15. Spikes 5·5–9 cm. long, female part about 1 cm. thick ; utricles 4·5–5 mm. long, oblong but shortly tapering at each end . . 9. *C. feani*

14. Leaves 2–6·25 mm. wide ; spikes 4–8, 1·5–5·5 cm. long :

16. Female glumes oblong or cuneate, apex very obtuse to bilobed-emarginate, awn 1–3 mm. long ; utricles 3·25–3·5 mm. long 13. *C. inverso-nervosa*

16. Female glumes oblong-lanceolate or lanceolate, apex acute to subobtuse, mucro 0·25–0·75 mm. long ; utricles about 5 mm. long 11. *C. tahitensis*

Subgen. 1. **Indocarex** *Baill.*

Key to the Sections.

1. Stems lateral. Secondary panicles simple, few-spiked. Lower bracts not exceeding their secondary panicles. Achenes obovoid 1. *Scabrellae*

1. Stems central. Secondary panicles compound, many-spiked. Lower bracts exceeding the whole inflorescence. Achenes ellipsoid :

2. Secondary panicles single. Spikes few-numerous. Utricles multinerved, sometimes subinflated-trigonous. Achene with apex of beak sometimes discoid-annulate . . . . 2. *Stramentitiae*

2. Secondary panicles binate. Spikes numerous. Utricles nerveless or few-nerved, not subinflated-trigonous. Achene with apex of beak not discoid-annulate . . . . . 3. *Filicinae*

Sect. 1. **Scabrellae** *Kükenth.*

in Engl. Pflanzenr. IV, 20 : 286 (1909).

Stems lateral. *Inflorescence* of 6–12 single or binate secondary panicles, each panicle consisting of 1–4(–5) peduncled spikes. *Bracts* short, sheaths ampliate. *Female glumes* usually sparsely hispidulous above, with nerves often reddish. *Utricles* subinflated, glabrous or hispidulous, greenish to reddish-brown. *Achene* obovoid. *Style-base* not thickened.

Only Polynesian species . . . . . 1. *C. oligostachya*

1. **Carex oligostachya** *Nees ex Hook.* in Kew Journ. Bot. 6 : 29 (1854) ; Nelmes, 244.—Philippine Islands, *Cuming* 1795.

Carex rhizomatosa Steud., Syn. Pl. Glum. II, Cyper. 206 (1855) ; Kükenth., 289.—Lesser Sunda Islands, Sumbawa, *Zollinger* 3447.

Carex buchaënsis Palla in Rechinger, Bot. u. Zool. Ergebn. von den Samoa-u. Salomonsinseln, 3 (1913)—Solomon Islands, Bucha Island, *Rechinger* 4047.

Tufted. *Rhizome* shortly creeping, sheathing-scaly. *Stems* erect or suberect, subscapiform, bearing a few, short-bladed leaves, evenly

spaced or only subbasal, 20–88 cm. tall, 0·75–2 mm. thick, smooth, including the rhachis, except sometimes sparsely hispidulous apical angles, base clothed with a mass of brown or purplish-brown to fuscous fibrous remains of withered leaf-sheaths. *Leaves of the sterile shoots* few, much shorter than the flowering stems, 2 5 mm. wide, flat or flattish, margins sometimes slightly revolute, upper surface sometimes scaberulous above. *Inflorescence* a simple, interrupted panicle 9–47 cm. long ; *secondary panicles* erect, lower single, upper unequally binate, rarely ternate, oblong, ovoid, or subglobose in outline, upper contiguous to subapproximate, lower distant to remote, upper on scarcely to shortly, lower on longly to very longly, exserted peduncles ; *peduncles* obscurely angled or compressed, very slender, smooth, rhachis scaberulous on the angles. *Bracts* foliaceous, lower usually shorter than their panicles, longly sheathing, upper reduced, usually exceeding their panicles, sometimes slightly exceeding the stem, all shortly sheathing ; *sheaths* membranous and often reddish near the mouth. *Spikes* ovoid, ellipsoid, or shortly cylindric, 4–10 mm. long, subdense-flowered, lateral becoming patulous to subpatent, sessile, male and female parts about equal or male shorter. *Bracteoles* indistinguishable from the glumes. *Female glumes* ovate to ovate–oblong lanceolate, flattish-cymbiform, apex obtuse or very obtuse, rarely subacute, 2–3 mm. long, 1·25–2 mm. wide, pale brownish, often with reddish spots, streaks, and patches, narrowly to very widely whitish–hyaline–margined, nervose, midrib coalescing above with 2 adjacent nerves and usually excurrent in a minutely hispidulous awn up to 1 mm. long. *Utricles* ellipsoid, obtusely to obscurely angled, 2·5–4 mm. long, 1–2 mm. broad, multinerved, narrowly marginate, glabrous, or sparsely hispidulous above, becoming subpatent to patent, base spongy, scarcely stipitate, apex subgradually to subabruptly beaked ; *beak* subconic or compressed-conic, 0·75 1 mm. long, marginate below, glabrous or sparsely hispidulous-margined, straight, bidentulate ; *mouth* slightly oblique ; *teeth* about 0·25 mm. long, straight. *Achene* angles prominent, faces subconcave, 2–2·25 mm. long, about 1 mm. broad, cinereous or yellow-brown, sometimes blackish above, very shortly stipitate and beaked.

Solomon Islands : Bucha Island ; in the Alang-alang formation nearest the village of Jeta, *Rechinger* 4047.

India, Upper Burma, Indo-China, Malaysia.

I have not seen Rechinger's plant, which was destroyed in the second world war, but from Palla's description I think it is most probably *C. oligostachya* Nees ex Hook.

Sect. 2. **Stramentitiae** (*C. B. Clarke*) *Nelmes* in Reinwardtia, 1 : 250 (1951).

[Series] *Stramentitiae* C. B. Clarke in Journ. Linn. Soc. Bot. 37 : 4 (1904).

Secondary panicles single. *Spikes* few-numerous. *Female glumes* often pale. *Utricles* multinerved. *Achene* usually ellipsoid or rhomboid-ellipsoid, apex sometimes discoid-annulate.

Utricles 2·75–3 mm. long, margins vitreous-hispid ; achene oblong-obovoid to ellipsoid . . . . . 4. *C. fuirenoides*

Utricles 3·5–5 mm. long, margins glabrous ; achene ellipsoid or rhomboid-ellipsoid :

Female glumes usually more or less oblong, apex usually truncate-rotund or bilobed-emarginate, 2 3·5 mm. long ; utricles sub-inflated-trigonous . . . . . 2. *C. dietrichiae*

Female glumes more or less ovate, apex acute or subacute, 1·5–2 mm. long ; utricles distinctly trigonous . . . . 3. *C. fissilis*

2. **Carex dietrichiae** *Boeck.* in Flora. 58 : 122 1875 ; C. B. Clarke, 8 ; Nelmes, 273.—Queensland, *Dietrich* 644 and 653.

Carex indica L. var. *milnei* Boott ex C. B. Clarke in Hook. f., Fl. Brit. Ind. 6 : 715 (1894).—Fiji, *Milne*.

Loosely to densely tufted. *Rhizome* short. *Stems* erect, faces flattish, 15 25–77 cm. tall, 1–2·5 mm. thick below, smooth, rhachis sparsely hispidulous above, surrounded, below the leaves, by a more or less entire, pale, brownish to blackish nerved, leafless sheaths or their fuscous fibrous remains. *Leaves* basal and subbasal, 0–1 higher on the stem, some much exceeding the stems, 5–10 mm. wide, flat or flattish, margins sometimes revolute : *sheaths* brown to fuscous or with blackish nerves on the back, membranous in front. *Inflorescence* a compound, interrupted, rather slender panicle, occupying the upper 16–35 cm. of the stem ; *secondary panicles* 3 8, single, erect, more or less oblong or oblong-lanceolate in outline, 2–7 cm. long, 1–2·5 cm. broad, upper approximate to rather distantly lower distantly spaced, subdense, branches often simple spikes, occasionally lower again branched into several simple spikes, patulous to subpatent, upper on shortly or very shortly lower on shortly to longly exserted peduncles ; *lower peduncles* smooth, especially below, upper distinctly and scaberulous-angled, especially above, slender but firm. *Rhachis* of the secondary panicles acutely and hispidulously angled. *Bracts* foliaceous but upper much reduced, usually all exceeding, some rarely exceeded by, the stem, lower longly to very longly, upper longly to shortly, sheathing ; *sheath*-mouth membranous, brown, glabrous to hispidulous, and concave. *Spikes* cylindric, but male part the more slender and tapering at the apex, 5–15 mm. long, subdense-flowered, becoming patent, male and female parts usually about equal but sometimes male part considerably the longer. *Bracteoles* glumiform, midrib excurrent in a long up to 5 mm. or more filiform, hispidulous, often curved awn. *Female glumes* oblong, oblong-ovate, or lanceolate, cymbiform, margins often involute, apex truncate to rotund, sometimes bilobed-emarginate, less commonly subacute to subobtuse, 2–3·5 mm. long, 1–1·5 mm. wide, usually glabrous but sometimes sparsely hispidulous towards the apex, castaneous above and on the margins below, or stramineous with castaneous patches, whitish stramineous below and usually in a narrow, central stripe above, margins widely whitish-hyaline above, distinctly nervose, midrib, coalescing with 2 adjacent nerves above, excurrent in a widish, hispidulous awn 0·5–3·5 mm. long. *Utricles* ellipsoid to obovoid-ellipsoid, rarely subglobose, subinflated and obscurely trigonous, faces often concave below, 3·5–5 mm. long, 1·25–2 mm. broad, multinerved, narrowly marginate, glabrous, sometimes

slightly scurfy, apical margins sometimes sparsely hispidulous, usually straight or straightish, rarely slightly bent, becoming subpatent, not or very shortly stipitate, subabruptly beaked ; *beak* subterete or compressed, 1·5–2 mm. long, narrowly marginate, glabrescent to sparsely hispidulous-margined, straight, rarely slightly twisted ; *mouth* castaneous, oblique, forming an acuminate, acute, whitish-hyaline apex. *Achene* broadly ellipsoid or rhomboid-ellipsoid, angles pale, prominent, especially medianly, faces somewhat concave, especially below, 2·25–3 mm. long, 1·25 1·8 mm. broad, becoming very dark brown, abruptly extremely shortly stipitate, abruptly very shortly beaked ; *beak* cylindric, apex slightly expanding, discoid-annulate. *Style*-base slightly thickened pyramidally.

Caroline Islands : Palau ; Mt. Elsum, 15 Sept. 1937, *Hosokawa* 9252 (BISH) (a poor specimen but it seems to belong here) ; ibid., Mt. Luis-Almonogui, Almonogui, Babeldaob, 14 April 1938, *Kanehira & Hatusima* 4937 (FU) ; ibid, Kamusetu, *Hatusima* 4994 (det. Ohwi as *C. fuirenoides* Gaudich. ; not seen by me, but as Ohwi misidentified *Kanehira & Hatusima* 4937, I feel that he may also have misidentified *Hatusima* 4994).

Solomon Islands : St. George Island ; Voyage de l'Astrolabe et de la Zelée, 1838–40, *Hombron* (K).

New Caledonia : forest at Balada, 1855–60, *Viellard* 1464 (P) ; ibid., shady places, *Viellard* 336 (P) ; Gatope, 1861–67, *Viellard* 3336 (K) ; Kanala, 1861–67, *Viellard* 3339 (K) ; 1868 70, Cadala, *Balansa* 1924 (P) ; mountains near Ou Hinna, 400 m., 5 Jan. 1903, *Schlechter* 15647 (K, P) ; Table-Unio, Sept. 1909, *Le Rat* 915 (P) ; Ermitage stream, among stones, serpentine, 90 m., 1914, *Compton* 197 (not seen) ; grassy hilltop, near highest crest in hills between Farino and Table Unio, E., 400 m. or more, 19 Dec. 1947, *Buchholz* 1525 (K).

Fiji Islands : Ngau, waste places, abundant, H.M.S. Herald, Sept. 1855, *Milne* 173 (K) ; ibid., Oct. 1855, *Milne* 216 (K) ; Ovalau, waste places, *Milne* 274 (K) ; Naviti Levu, damp places, woods, frequent, 1858, *Milne* 16, 23 (K) ; near Lautoka, pits in shade above creek, 240 m., 22 Aug. 1920, *Greenwood* 37 (K) ; Labasa, in clumps, shady moist ground near creek, 180 m., 27 Aug. 1922, *Greenwood* 498 (K) ; ibid., shade of thin forest, 150 m., 23 Sept. 1922, *Greenwood* 559 (K) ; Viti Levu, Tholo North, Nandarivatu, open forest, 20 -22 Nov. 1940, 800–900 m., *Degener & Ordonez* 13543 (AA, K) ; Viti Levu ; Mba (formerly Tholo North), slopes of the escarpment north of Nandarivatu, 550–800 m., wet places on open slopes, 15–29 Sept. 1947, *A. C. Smith* 6260 (AA, K) ; ibid., Mba, Mt. Evans Range, in thick bush, ± 800 m., 9 Sept. 1951, *Greenwood* 1214 (K).

Three Fiji gatherings, A. C. Smith 5164, 5707 and 5837, may belong here but their spikes are too young for me to determine them with certainty.

Queensland, Malaysia.

3. **Carex fissilis** *Boott*, Illustr. 2 : 86, t. 245 (1860).—New Caledonia, *Milne* 289.

Carex indica var. *fissilis* (Boott) Kükenth. in Engl. Pflanzenr. IV, 20 : 546 (1909).

Rhizome and lower part of stem unknown ; upper part of *stem* with prominent but obtuse angles, 1·25–2 mm. thick and smooth below, hispidulous on the angles of the rhachis, mainly just below the nodes. *Leaves* unknown (see under *bracts* below for some leaf-like characters). *Inflorescence* a compound panicle, occupying the upper 10–28 cm. or more of the stem ; *secondary panicles* 5 or more, erect or suberect, more or less oblong-lanceolate, 3·5–7·5 cm. long (1·5–) 2–3 cm. broad, upper contiguous or subapproximate to somewhat distantly lower distantly spaced, lax to subdense, lower branches again branched into 3–7 simple spikes, upper ones simple spikes, spikes patulous to subpatent, upper panicles on shortly lower on longly exserted peduncles ; *peduncles* distinctly angled and scabrid above, obscurely angled and smooth below. *Rhachis* of the secondary panicles sparsely hispidulous on the obtuse angles below, densely on the acute angles and more or less on the whole surface above. Lower *bracts* 4–7 mm. wide, upper much reduced, all exceeding some much exceeding the stem, flat or flattish, lower longly upper shortly sheathing. *Spikes* numerous, 6–15 mm. long, subdense-flowered, male part equalling to much shorter than the female part. *Bracteoles* glumiform, midrib excurrent in an awn up to 2 cm. long. *Female glumes* widely ovate or triangular-ovate, cymbiform, apex subacute to obtuse, (1·25–) 1·5–2 mm. long, about 1·5 mm. wide, glabrous or very sparsely hispidulous in places, brown with a wide whitish-hyaline margin, nervose, midrib excurrent in a sparsely hispidulous-margined awn 0·25–1 (–1·5) mm. long. *Utricles* ellipsoid, sometimes slightly obovoid-ellipsoid, obtusely but distinctly angled, 3·6–4·6 mm. long, 1–1·25 mm. broad, narrowly marginate, glabrous, apex usually somewhat reflexed, suberect to patulous, base subbulbously spongy-thickened, not stipitate, apex subabruptly beaked ; *beak* plano-convex, gradually tapering, usually straightish, not twisted, 1·5–2 mm. long, narrowly marginate, smooth or margins sparsely scaberulous, bidentate ; *mouth* oblique. *Achene* ellipsoid, distinctly trigonous, 1·75–2·25 mm. long, about 1 mm. broad, scarcely or very shortly stipitate, apex abruptly and shortly beaked ; *beak* usually bent, apex not discoid-annulate. *Style*–base thickened.

New Caledonia : Anuteum, waste places, Nov. 1853, *Milne* 289 (K). Kükenthal Engl. Pflanzenreich. IV, 20 : 264 : 1909 , cites the following additional gatherings from New Caledonia which may belong here : " *Milne* n. 7948 ; Lecard."

Endemic.

4. **Carex fuirenoides** *Gaudich.* in Freycinet. Voy. Bot. 412 (1826 ; Boott, Illustr. 4 : 156. t. 507 (1867 ; C. B. Clarke, 11, *partim* ; Kükenth., 287—Mariana Islands, Guam, *Hombron.*

Apparently tufted. *Rhizome* short. *Stem* erect, 67 cm. tall, about 2·5 mm. thick below, smooth up to the rhachis, surrounded, below the leaves, by fuscous, fibrous remains of leaf-sheaths. *Leaves* basal and several spaced through the stem and much exceeding it, 8–11 mm. wide, flattish ; *sheaths* brown- to blackish-nerved on the back below. *Inflorescence* a compound, interrupted panicle, occupying about the upper half of the stem ; *secondary panicles* about 8, erect, more or less oblong, 2–8 cm. long, 1–2 cm. broad, upper subapproximate or rather distantly,

lower distantly, spaced, dense, all or nearly all the branches again branched, the lower and middle ones twice, into numerous simple spikes, upper ones simple spikes, patulous to subpatent, upper on wholly included or on shortly, lower on longly, exserted peduncles ; *peduncles* trigonous, lower smooth, upper scabrid. *Rhachis* smooth below, hispidulous above including the rhachis of the secondary panicles. *Bracts* much exceeding the inflorescence, upper much the smaller, scarcely or shortly, lower rather longly to longly sheathing. *Spikes* numerous, lanceolate-cylindric, 5–8 mm. long, subdense-flowered, male and female parts about equal or the male part longer. *Bracteoles* glumiform, midrib excurrent in a ciliolate-scaberulous, curved or flexuous awn, 5–10 mm. or more long. *Female glumes* squarish-oblong, ovate, or lanceolate, cymbiform, apex obtuse to rotund or truncate, 0·75–2·5 mm. long, 1–1·5 mm. wide, glabrous, or sometimes hispid above, pale below, bright castaneous above, upper margins widely whitish-hyaline, nervose, midrib excurrent in a sometimes curved, densely hispid awn, 1–3 mm. or more long. *Utricles* obovoid, ellipsoid-obovoid, or oblong-obovoid, obscurely angled, 2·75–3 mm. long, about 1 mm. broad, narrowly marginate, glabrous below, sparsely vitreous-hispid on one or both margins and sometimes on several nerves at the apex, straight or somewhat bent, patulous, fuscous-brown, scarcely stipitate, apex subabruptly beaked ; *beak* compressed-terete, about 1 mm. long, narrowly marginate, vitreous-hispid-margined, sometimes twisted, bidentate ; *mouth* oblique. *Achene* oblong-obovoid to ellipsoid, angles prominent, 1·75–2 mm. long, 0·8–1·1 mm. broad, scarcely stipitate, apex abruptly and shortly beaked ; *beak* straight, apex slightly discoid-annulate. *Style*-base somewhat thickened.

Mariana Islands : Guam ; Voyage de l'Astrolabe et de la Zelée, 1838–40, *Hombron* (K) ; " topotype collected under the direction of J. B. Thompson, 7 Nov. 1913 " (Bur. Sci. Manila, Philippine Is., No. 279) (BISH, K).

Endemic.

The description above has been drawn up from two gatherings, that of the vegetative characters from the topotype, because these are absent from the type, of the fruits from the type (Hombron's) specimen, and that of the glumes from both.

This *Indocarex*, isolated geographically, is difficult to place in relation to other *Indocarices*. Its greatest affinity seems to be with the Philippine Islands *C. cirrhulosa* Nees in Sect. *Stramentitiae*, which Kükenthal treated as its variety.

Sect. 3. **Filicinae** (*C. B. Clarke*) *Nelmes*
in Reinwardtia, 1 : 250 (1951).

[Series] *Filicinae* C. B. Clarke in Journ. Linn. Soc. Bot. 37 : 4 (1904).

Secondary panicles binate. *Spikes* numerous to very numerous. *Utricles* nerveless or few-nerved.

Only Polynesian species . . . . . 5. *C. neohebridensis*

5. **Carex neohebridensis** *Guillaum. et Kükenth.* in Bull. Mus. Nat. Hist. Paris, sér. 2, 9 : 304 (1937).—New Hebrides, *De la Rue*.

Rhizome short. *Stem* erect, rigid, 56 cm. tall, smooth, leafy. *Leaves* scarcely as long as the stem, 4 mm. wide, flat, margins often revolute and scabrid. *Inflorescence* a compound, rather slender, interrupted panicle, 20 cm. long ; *secondary panicles* 10 and more, elongate-oblong, rather loose, lower remote, unequally peduncled ; *peduncles* erect, slender, hispidulous. *Rhachis* hispidulous. *Bracts* longer than their panicles, longly sheathing. *Spikes* numerous, linear-oblong, 12 mm. long, dense-flowered, suberect, male part shorter than the female part. *Female glumes* ovate, glabrous, rich ferrugineous, more or less aristate. *Utricles* narrowly ellipsoid, 4 mm. long, narrowly marginate, glabrous, margins slightly hispidulous above, suberect, stramineous, dark-tinged, base conspicuously stipitate, gradually beaked above ; *beak* about as long as the rest of the utricle, subulate, apex subincurved ; *mouth* hyaline, deeply bidentate. *Achene* ellipsoid. *Style*-base slightly thickened.

New Hebrides : Epi ; Mt. Nuellim, 843 m., the highest point on the island, *De la Rue*.

Stated by the authors of the name to be the first *Carex* from the New Hebrides, and to be closely related to *C. rafflesiana* Boott and *C. pycnothyrsos* Kükenth.

I have not been able to see specimens of this species, and its description is a translation of Guillaumin and Kükenthal's.

Endemic.

Subgen. 2. **Carex.**

Key to the Sections.

1. Stigmas 3 ; utricles more or less trigonous :
   2. Spikes in fascicles, androgynaeceous ; utricles not papillose . . . . . 4. *Decorae*
   2. Spikes single at each node, terminal male, lateral mostly female ; utricles densely and minutely papillose . . . 6. *Anomalae*

1. Stigmas 2 ; utricles plano-convex or biconvex :
   3. Bracts mostly sheathing ; spikes in fascicles ; utricles setulose . . . . . 5. *Graciles*
   3. Bracts mostly not sheathing ; spikes single at each node ; utricles glabrous . . . . . 7. *Longispicae*

Sect. 4. **Decorae** (*Kükenth.*) *Ohwi*
in Mem. Coll. Sci. Kyoto Imp. Univ. ser. B, 11 : 338 (1936).

Spikes in fascicles, simple or bearing smaller branch-spikes, androgynaeceous, or at least one in each fascicle often male or female, often more or less lax-flowered, lower usually longly peduncled. *Bracts* sheathing. *Female glumes* usually more or less dark reddish, sometimes fulvous, castaneous, or vinaceous, usually strongly incurved at the base. *Utricles* ellipsoid or oblong but tapering at each end, often more or less nerveless, often dark reddish or with dark reddish patches ; *beak* long, apex usually bidentulate.

Only Polynesian species . . . . . 6. *C. gibbsiae*

6. **Carex gibbsiae** *Rendle* in Journ. Linn. Soc. 39 : 180 (1909).— Fiji, *Gibbs* 795.

Carex vitiensis St. John in Pacific Science, 1 : 116, f. 1 [p. 117] (1947).— Fiji, *St. John* 18330.

Densely tufted. *Rhizome* short, woody, horizontal or descending, clothed with reddish-brown sheathing scales or their fibrous remains. *Stems* erect, angles acute to obtuse, 90–100 cm. tall, 1·5–1·75 mm. thick, smooth. *Leaves* all basal or one sub-basal, long but shorter than the stem, 4–7 mm. wide, flat ; *sheaths* reddish-brown on the back, paler in front with reddish glands and thinly membranous. *Inflorescence* erect, or slightly cernuous above, composed of 6 8 fascicles at (upper) rather distant to (lower) distant nodes, 45 55 cm. long, narrow ; *fascicles* 4·5–8 cm. long, each composed of 5–14 spikes. *Bracts* longer (lower) or shorter (upper) than their fascicles, lower foliaceous, upper subfoliaceous ; *sheaths* membranous and hispidulous in front at the mouth, reddish at the nodes. *Spikes* androgynaeceous, 2·5 3·5 cm. long, male part very slenderly cylindric, female part 1·5–3 mm. thick, mostly simple but longest spike in lower fascicles with short spike branched from its base, this longest spike with longer male apices than the others especially in upper fascicles, majority with short male apices ; *peduncles* very slender to filiform, trigonous or compressed, hispidulous (scaberulous) on angles, shortly in upper longly or very longly exserted in lower fascicles, female part lax-flowered. *Female glumes* oblong-obovate, incurved below, cymbiform above, apex rounded or shortly tapering and very obtuse, erose-ciliolate, 2–3 mm. long, 1·1 1·4 mm. wide, thin and translucent, usually hispidulous in lines or patches above, otherwise glabrous, pallid or pale brownish-green with reddish flecks and flushes and wide whitish-hyaline margins above, distinctly nervose, midrib and 2 adjacent stout nerves on a central greenish stripe coalescing above and usually excurrent from a point well below the apex in a hispidulous-margined awn up to 1 mm. long. *Utricles* very narrowly ellipsoid, trigonous, 5–6 mm. long, 0·8–1 mm. broad, few-nerved, hispidulous on nerves in places and on the margins from base or middle upwards, sometimes nearly glabrous on the back, straight or straightish, erect to patulous or subpatulous, brownish-stramineous, or greenish-stramineous, very shortly concave-convex stipitate, gradually to subgradually beaked ; *beak* at first tapering, plano-convex or concave-convex or trigonous, 2–2·5 mm. long, narrowly marginate, hispidulous on the margins and sometimes in lines ventrally, glabrous dorsally, green, bilobed or bidentate ; *lobes or teeth* straightish, becoming erose ; *mouth* scarcely dorsally oblique. *Achene* (a little immature) more or less oblong, trigonous, angles prominent and faces concave, 2–3 mm. long, 0·7–0·8 mm. broad, up to 0·5 mm. stipitate, abruptly beaked ; *beak* bent at base, thickened-annulate at apex, 0·25 mm. long. *Style*-base scarcely to slightly thickened, persistent. *Stigmas* 3.

Fiji Islands : Viti Levu, near summit ridge of Mt. Victoria, mossy rain forest, ± 1200 m., Oct. 1907, *Gibbs* 795 (BM) ; ibid., Taunaisali, Wainisavulevu-Nubulolo divide, the central plateau between the Wainimala and Singatoka Rivers, clumps in swampy rain-forest, 1140 m., 18 Aug. 1937, *St. John* 18330 (BISH).

Sect. 5. **Graciles** *Tuckerm.*,
Enum. Meth. 10 (1843).

Tufted. *Rhizome* slender, rarely elongate. *Stems* slender or very slender, but fairly firm, tall. *Leaves* narrow. *Spikes* usually androgynaeceous, simple or branched 'compound', often in fascicles, sometimes single at each node, lax- to subdense-flowered, on slender peduncles, erect to somewhat cernuous. *Bracts* sheathing. *Utricles* usually elliptic, sometimes ovate, plano-convex, less often biconvex, often hispidulous, sometimes glabrous, erect to subpatulous, membranaceous, nervose, usually conspicuously and cuneate-stipitate, usually longly beaked. *Stigmas* 2, slender, often long or very long.

Only Polynesian species . . . . . 7. *C. brunnea*

7. **Carex brunnea** *Thunb.*, Fl. Japon. 38 (1784); Schkuhr, Riedgr. 2 : 16, t. XX, fig. 111 (1806); C. B. Clarke, 5; Kükenth., 599; E. G. Camus in Lecomte, Fl. Gén. Indo-Chine, 7 : 194 (1922); Nelmes, 357. —Japan.

Carex kanehirae Ohwi in Acta Phytotax. & Geobot. 8 : 67 (1939).—Caroline Islands, Palau, *Kanehira & Hatusima* 4579.

Tufted. *Rhizome* short, clothed with dark, nitidous, sheathing scales or their fibrous remains. *Stems* erect to oblique, obtusely angled, slenderly ribbed, finely striate, 30–100 cm. tall, 1–1·75 mm. thick below, smooth below and sometimes above, scaberulous above or only on the upper part of the rhachis, surrounded, below the leaves, by longish, dull, olive-brown, scurfy, firm cataphylls, brown and nitidous inside, membranous front tending to split into somewhat reticulate fibres. *Leaves* basal and subbasal, shorter to longer than the stem, 1·5–4 mm. wide, flattish, stiff, upper surface usually covered with small protuberances which are scabrid above. *Inflorescence* a rather slender, continuous to interrupted panicle, consisting of 4–8 *fascicles*, each fascicle consisting of 1–5 spikes, one at each node usually longer than the others, especially below, with 2–5 smaller spikes branching from it, and occupying the upper 6–56 cm. of the stem, upper fascicles subapproximate and some fastigiate, lower rather distantly spaced. *Spikes* 0·7–4·5 cm. long (including branched spikes), female part usually very much exceeding the male part, which is 0.5–1 mm. thick, female part 2–4 mm. thick, upper on scarcely or shortly lower on longly exserted peduncles; *peduncles* smooth to scaberulous. *Bracts* of the lower fascicles foliaceous or subfoliaceous, longer than their fascicles but much shorter than the whole inflorescence, upper bracts reduced, uppermost 1–2 reduced to large longly awned glumes, not sheathing; *sheaths* dark brown or castaneous and concave at the mouth. *Female glumes* oblong-ovate, ovate, or ovate-lanceolate, cymbiform but margins involute, apex acute to obtuse, 2·5–4 mm. long, 1·25–1·5 mm. wide, slenderly nervose, glabrous, light to reddish-castaneous, margins above not or sometimes very narrowly whitish, often erose, midrib keeled, green, extending nearly or quite to the apex. *Utricles* ovate, oblong-elliptic, elliptic, or suborbicular, 2·75–4·75 mm. long, 1·2–1·5 mm. broad, narrowly marginate, minutely and rather sparsely whitish-setulose, straight or straightish, castaneous to cinnamomeous-brown, abruptly or subabruptly beaked; *beak* slightly or scarcely

tapering, plano-convex or compressed, 0·5–1 mm. long, narrowly or scarcely marginate, setulose margined, bidentulate ; *teeth* becoming erose. *Achene* elliptic, ovate, oblong-ovate, or suborbicular, compressed, 1·75–2·25 mm. long, 1·2–1·4 mm. broad, stramineous, not stipitate, not or scarcely beaked. *Style-base* somewhat thickened. *Stigmas* up to a little longer than the utricle.

Caroline Islands : Palau ; Aimiriik, near the Ngaspan waterfall, 3 April 1938, *Kanehira & Hatusima* 4579 (FU).

New Caledonia : 1868–70, *Balansa* 1925 (P) ; forests N. of the Conception, ± 600 m., Feb. 1870, *Balansa* 2930 (P) ; banks of the Dotio, near its mouth, Jan. 1872, Balansa 3571 (P) ; Hienghène, 1900–10, *M. et Mme. Le Rat* (P) ; *Cribs* 1231 (P).

India, China, Japan, Queensland.

Sect. 6. **Anomalae** *Carey*
in Gray, Man. ed. 1, 557 (1848).

Terminal spike male, less commonly gynaecandrous, lateral usually female, dense-flowered, erect or cernuous. *Bracts* foliaceous, sheathing or sheathless. *Female glumes* small, fulvous, castaneous, or ferrugineous, muticous or aristate. *Utricles* small, membranaceous, compressed or trigonous, glabrous, densely but minutely papillose, greenish-ferrugineous or cinnamomeous, erostrate or shortly beaked ; *beak* emarginate-bidentulate at the apex.

Only Polynesian species . . . . . 8. *C. neurochlamys*

8. **Carex neurochlamys** *F. Muell.*, Fragm. 8 : 258 (1874).—Australia, *Stuart, Dalachy.*

Carex maculata Boott var. *neurochlamys* (F. Muell.) Kükenth. in Engl. Pflanzenr. IV. 20 : 428 (1909).

Carex samoensis Boeck. in Engl. Bot. Jahrb. 25 : 588 (1898).—Samoa, Savii, *Reinecke* 176 and 456.

Densely tufted. *Rhizome* short, woody. *Stems* erect to oblique, obtusely angled, 15–30 cm. tall, 1–1·5 mm. thick below, smooth, including the rhachis, surrounded, below the leaves, by a few reddish-brown or reddish-spotted cataphylls and/or their withered, fibrous remains. *Leaves* subbasal, often much longer but sometimes shorter than the stems, 3–6 mm. wide, flattish but margins often slightly revolute, suberect to oblique, often somewhat recurved ; *sheaths* pale to ferrugineous or ferrugineous-spotted, membranous in front. *Spikes* 5–6, upper 3–4 crowded to approximate and fastigiate, remainder subapproximate to rather distant from one another, cylindric, 1–3·5 cm. long, terminal male, 1·5–4 mm. thick, pale, remainder female or upper one or more androgynaeceous, male apices short, suberect to patulous, 4–5 mm. thick, upper sessile or on shortly, lowest 1–2 on shortly to longly, exserted peduncles ; *peduncles* 0·4–0·9 mm. thick, smooth. *Bracts* with firm apices, lower far exceeding the male spike, upper much reduced, lower shortly to longly upper not or shortly sheathing ; *sheaths* light ferrugineous and thinly membranous at the mouth. *Female glumes* ovate or oblong-ovate, base thickened and slightly gibbous, shallowly cymbiform

to flattish above, apex acute or subobtuse and often minutely ciliolate, 1·75–2·5 mm. long, 1·1·5 mm. wide, thin, translucent, castaneous, margins sometimes very narrowly and irregularly whitish-hyaline above, with a pale green, 3-nerved, central stripe converging and coalescing above, rarely failing to reach the apex, usually very shortly mucronate. *Utricles* elliptic or ellipsoid, trigonous or somewhat shrunken and compressed-trigonous, a longitudinal ridge on the ventral face, and a raised-flattish or asymetrically trigonous dorsal face, 2·25–3 mm. long, 1·2–1·5 mm. broad, strongly multinerved, narrowly marginate, straight, becoming patulous, green or olive-green to warm reddish, ferrugineous, scarcely or very shortly and stoutly stipitate, subgradually or subabruptly contracted above into a beak ; *beak* cylindric-conic, 0·25–0·4 mm. long, scarcely marginate, straight or sometimes slightly bent and/or twisted, entire or minutely pale notched. *Achene* obovoid, sometimes ellipsoid-obovoid, conspicuously trigonous, faces flattish or shallowly concave, 1·25-2 mm. long, 0·75–1·3 mm. broad, densely and minutely alveolate, stramineous to dark-brown, stipitate, beak very short, stipe and beak pale and often bent and/or twisted. *Style*-base thickish and pale.

New Caledonia : mountain woods, rare, *Vieillard* 498 (P) ; 1855–60, Balade, forest, *Vieillard* 1465 (P) ; on the mountains near Oubatche, 600 m., 23 Dec. 1902, *Schlechter* 15541 (K) ; Mt. Mou, freshwater swamp, margin of cultivation, serpentine, 300 m., *Compton* 472 ; Ignambi ; moist and shady forest, gneiss, 600–900 m., *Compton* 1510. I have not seen the Compton numbers.

Samoa Islands : Island of Savii ; Upolu, near Lanuto'o, *Reinecke* 176 (BOG) ; near Lepaega, *Reinecke* 456. I have not seen *Reinecke* 456 which is included here on the authority of Kükenthal.

Australia.

Sect. 7. **Longispicae** *C. B. Clarke*
in Journ. Linn. Soc. Bot. 37 : 3 (1904).

Stems usually tall and stout, angles acute and scabrid above. *Leaves* usually longer than the stems, stiff and coriaceous, lower reduced to blackish-red or vinaceous cataphylls or leafless sheaths which fray into sometimes herring-bone shaped fibres. *Spikes* 4-numerous, upper 1–6 male, lateral androgynaeceous, or all androgynaeceous, usually single at each node, erect or cernuous, usually dense-flowered, lower usually longly peduncled. *Bracts* foliaceous, lower exceeding often much exceeding the stem, usually not but sometimes sheathing. *Female glumes* often more or less oblong, apex obtuse to rounded or emarginate, a pale 3-nerved central stripe coalescing above and often excurrent. *Utricles* plano-convex or biconvex, usually plurinerved or multinerved, stipitate, scarcely to shortly beaked ; *mouth* very small. *Achene* elliptic to obovate, not medianly constricted. *Stigmas* 2.

1. Spikes 15–27 ; female glumes 1·4–2·5 mm. long ; utricles 1·8–2·5 mm. long . . . . . 14. *C. graeffeana*

1. Spikes 4–12 ; female glumes 2–4 mm. long ; utricles 3–5 mm. long :
   2. Upper 1–3 spikes male :

3. Spikes about 12, 4–20 cm. long, female part of spikes about 1 cm. thick ; utricles obovate, about 5 mm. long . 10. *C. stokesii*

3. Spikes 5–8, 1·25–5·5 cm. long, female part of spikes 4–7 mm. thick ; utricles elliptic or more or less lanceolate, 3·25–4·5 mm. long :

4. Uppermost spike male ; female glumes oblong to obovate, 2–2·5 mm. long ; utricles 3·5–4·5 mm. long, 1·25–1·5 mm. broad (uppermost spike always male) . 12. *C. savaiiensis*

4. Upper 1–3 spikes male ; female glumes more or less oblong, about 2 mm. long ; utricles 3·25–3·5 mm. long, 1·75–2·25 mm. broad (upper spikes sometimes androgynaeceous) 13. *C. inverso-nervosa*

2. Upper and usually lower spikes androgynaeceous :

5. Leaves 8–12 mm. wide ; spikes 8–9, 5·5–13 cm. long ; female glumes 3–4 mm. long :

6. Spikes 8–13 cm. long, female part 6–8 mm. thick ; utricles 3·25–3·75 mm. long, 1·8–2·3 mm. broad, obovate but tapering below . . . . . .10. *C. stokesii* var. *aristata*

6. Spikes 5·5–9 cm. long, female part about 1 cm. thick ; utricles 4·5–5 mm. long, 1·4–1·75 mm. broad, oblong but shortly tapering at each end . . . . . 9. *C. feani*

5. Leaves 2–6·25 mm. wide ; spikes 4–8, 1·5–5·5 cm. long ; female glumes 2–3 mm. long :

7. Female glumes oblong or cuneate, apex very obtuse to bilobed-emarginate, about 2 mm. long, 1–1·1 mm. wide, whitish with reddish spots and streaks, awn 1–3 mm. long ; utricles ovate-lanceolate or elliptic-lanceolate, 3·25–3·5 mm. long . . . . . 13. *C. inverso-nervosa*

7. Female glumes oblong-lanceolate to lanceolate, apex acute to subobtuse, 2·5–3 mm. long, 0·25–0·75 mm. wide, castaneous, mucro 0·25–0·75 mm. long ; utricles obovate-elliptic, about 5 mm. long . 11. *C. tahitensis*

9. **Carex feani** *F. B. H. Brown* in Bull. Bernice P. Bishop Mus., Honolulu, no. 84, p. 115, t. XV B (1931).—Hivoa, *F. B. H. Brown* 1036A, 1036B.

Rhizome wanting. *Stem* erect, about 80 cm. tall, about 4 mm. thick, angles acute, smooth below, scabrid on the angles of the rhachis. *Leaves* absent, but probably similar to though larger than the leafy bracts, described below. *Spikes* 8, lower at least probably all drooping, androgynaeceous, cylindric, 5·5 9 cm. long, female part 1 cm. thick, 3–6 cm. long, male part 3–5 mm. thick, 2–3 cm. long, upper longly lower very longly peduncled, lower distant upper less distant from or approximate to one another, overlapping to form a continuous inflorescence about

24 cm. long ; *peduncles* slender, scabrid on the angles. *Bracts* of the lower spikes decreasing in size from lower to upper, lowest 75 cm. long, 8 mm. wide, flat or flattish, very shortly sheathing at the base, those above not sheathing, upper bracts very much reduced and subfoliaceous to setaceous. *Female glumes* more or less oblong, or narrowly elliptic-oblong, flattish to cymbiform, margins often involute at the apex, which is very obtuse to erose-truncate, 3–4 mm. long, 0·75–1·2 mm. wide, whitish below and sometimes on the margins above, otherwise fulvous, nerveless except for the midrib and 2 adjacent, inflated, larger nerves, which converging above are excurrent in a compressed, reddish-brown, hispidulous-margined awn 0·75–1·5 mm. long. *Utricles* more or less oblong but shortly tapering at base and apex and sometimes slightly constricted at about halfway, biconvex or compressed-biconvex below, where the achene is situated, compressed on the upper, empty part, 4·5–5 mm. long, 1·4–1·75 mm. broad, membranaceous or subcoriaceous, strongly multinerved, very narrowly marginate, glabrous, straight to slightly recurved, patulous, light golden-brown, scarcely to very shortly cuneate-stipitate ; *beak* extremely short, conic, often reddish-brown, truncate at the mouth. *Achene* elliptic or obovate-elliptic, compressed biconvex, about 2 mm. long and 1·5 mm. broad, densely minutely puncticulate, becoming warm brownish, scarcely very stoutly stipitate ; *beak* spender, 0·1–0·2 mm. long. *Style* slender, often curved or flexuous, base not thickened.

Marquesas Islands : Hiva Oa island (Hivaoa), Mt. Temetiu, 900 m., 13 Dec. 1929, *Mumford & Adamson* HO 1002 (BISH) ; Hivoa, Feani, 800 m., Dec. 1921, *F. B. H. Brown*, " nos. 1036A and 1036B, type ".

I have not seen these two ' type ' numbers.

Endemic.

10. **Carex stokesii** *F. B. H. Brown* in Bull. Bernice P. Bishop Mus., Honolulu, no. 84, p. 116, fig. 13 [on p. 115] (1931).—Rapa, *Stokes* 244A.

Tufted. *Stems* erect, angles acute with shallowly concave or flattish faces, up to about 100 cm. tall, 3–5 mm. thick below, smooth below, probably scabrid on the angles above. *Leaves* numerous, basal and subbasal, sheathing the lower part of the stem, much exceeding the stem, 5–10 mm. wide, flat to flattish, longly sheathing, a few lower reduced to sheaths ; *sheaths* often splitting in front into fine herring-bone shaped fibres. *Spikes* about 12, suberect to cernuous, overlapping and forming a long terminal inflorescence, one or more of the upper spikes wholly male, remainder androgynaeceous, 4–20 cm. long, female part cylindric, about 1 cm. thick, male part slenderly cylindric, much shorter to slightly longer than the female part, upper rather shortly lower longly to very longly, peduncled ; *peduncles* slender, cernuous, spinulose-serrate on the angles. *Bracts* of the lower spikes much exceeding the terminal spike, upper progressively much to very much reduced, none sheathing. *Female glumes* lanceolate, apex obtuse, rounded, or truncate, about 3·5 mm. long, about 1·3 mm. wide, glabrous, brown, midrib and 2 adjacent nerves converging above and mucronulate. *Utricles* obovate, about 5 mm. long, multinerved, acutely beaked, mouth subentire or indistinctly bidentate. *Achene* broadly elliptic or obovate, compressed-biconvex, about 2·5 mm. long, about 1·6 mm. broad, yellow to dark-brown. *Style* slender.

Rapa : 100 m., 21 Sept. 1921, *Stokes* 244A ; Nukumala ; in gully, 60 m., 21 Sept. 1921, *Stokes* 262 (BISH) ; Rapa : forest on loose talus, immature, 21 Sept. 1921, *Stokes* 244B (BISH).

Endemic.

Of this species, represented by the above-mentioned numbers, I have seen only immature specimens, and am therefore dependent for much of this description on the original one, which, so far as the fruits are concerned, was presumably based on a fruiting specimen of *Stokes* 244A, the type of the species. This lack of fruiting material also prevents me from obtaining a good knowledge of the species and from assessing its relationship with var. *aristata* F. B. H. Brown.

Var. **aristata** *F. B. H. Brown* in Bull. Bernice P. Bishop Mus., Honolulu, no. 84, p. 117 (1931).—Rapa, *Quayle* O.

Tufted. *Stem* erect, angles acute, smooth below, scabridulous above, sides more or less shallowly concave, 130 cm. tall, 5 mm. thick below, but above the stouter, sheathing basal part. *Leaves* arising basally but sheathing much of the lower part of the stem, much exceeding the stem, up to 12 mm. wide, flat or flattish, longly sheathing ; *sheaths* often splitting in front into fine herringbone-shaped fibres. *Spikes* 9, suberect to cernuous, upper at approximate lower at distant nodes, overlapping and forming a terminal inflorescence, 28 cm. long, androgynaeceous, 8–13 cm. long, cylindric female part 6–8 mm., male part 1·5–3 mm., thick, the latter much shorter in the lower, about equal in the middle, and much longer in the upper, spikes than the female part, upper rather shortly lower longly to very longly peduncled ; *peduncles* rather slender, cernuous, smooth or nearly so. *Bracts* of the lower spikes much to little exceeding the apex of the terminal, upper bracts progressively much to very much reduced upwards, none sheathing but lower auricled at the base in front. *Female glumes* more or less oblong or elliptic-oblong, upper margins sometimes slightly involute; otherwise flattish or slightly cymbiform, apex erose-rounded or erose-truncate, 3·25–3·75 mm. long, 1–1·25 mm. wide, glabrous, light castaneous, margins sometimes paler especially above, midrib and 2 adjacent nerves which converge somewhat above forming a firm apex or excurrent in a flat, wide, smooth mucro up to 0·4 mm. long. *Utricles* obovate but tapering below, complanate above, biconvex below (due to the developed achene), 3·25–3·75 mm. long, 1·8–2·3 mm. broad, membranaceous, multinerved, scarcely or very narrowly marginate, glabrous, straight, becoming subpatent to patent, castaneous, scarcely or very shortly stipitate, apex scarcely or very shortly beaked, entire or bidentulate. *Achene* elliptic, compressed-biconvex, about 2 mm. long, 1–1·5 mm. broad, becoming blackish, densely but minutely puncticulate-papillose, not stipitate, shortly and slenderly pale-beaked. *Style* small, slender, base not or scarcely thickened.

Rapa : 1922, *Quayle* O (BISH).

Endemic.

11. **Carex tahitensis** *F. B. H. Brown* in Occas. Papers. Bishop Mus., Honolulu, 9, no. 4 : 8 (1930).—Society Islands, Tahiti, *MacDaniels* 1542.

Loosely tufted. *Rhizome* apparently not creeping. *Stems* erect, angles acute, scabrid, about 15–20 cm. tall, 1–2·25 mm. thick. *Leaves* arising basally but sheathing much of the stem and much exceeding it in length, 2–6 mm. wide, flat or with margins strongly revolute, longly sheathing, a few lower reduced to sheaths ; *sheaths* sometimes splitting in front into fine fibres, sometimes herringbone-shaped. *Spikes* 4–6, suberect to patulous, at approximate nodes, overlapping and forming a terminal inflorescence 4·5–20 cm. long, androgynaeceous, 1·5–3 cm. long, female part cylindric or ovoid-cylindric, 5–13 mm. thick, male part cylindric or lanceoloid, 2–3 mm. thick, usually much shorter but in the terminal sometimes longer than the female part, upper shortly or very shortly lower longly lowest sometimes very longly peduncled ; *peduncles* rather slender, angles scaberulous or scabrid. *Bracts* of the lower spikes much exceeding the apex of the terminal, upper bracts much reduced, none or lowest very shortly sheathing. *Female glumes* oblong-lanceolate to lanceolate, flattish to shallowly cymbiform, apex acute to subobtuse, 2·5–3 mm. long, 0·25–0·75 mm. wide, glabrous, castaneous with scarcely to narrowly whitish-hyaline margins and a wide, pale 3-nerved central stripe, converging, and the nerves coalescing above, excurrent in a usually hispidulous mucro, 0·25–0·75 mm. long. *Utricles* obovate-elliptic, compressed above, biconvex below, 3–5 mm. long, 1·5–2·75 mm. broad, submembranaceous, multinerved, scarcely or very narrowly marginate, glabrous, straight, patulous to subpatent, castaneous but paler below, tapering below to a spongy-thickened base, abruptly, shortly, and stoutly stipitate, shortly tapering above to a scarcely or very shortly beaked, bidentulate apex. *Achene* elliptic, compressed-biconvex, 1·8–1·9 mm. long, about 1·2 mm. broad, densely but minutely puncticulate, brown, with a very stout, pale, substipitate base, and a rather slender pale beak about 0·2 mm. long. *Style*-base slightly thickened.

Society Islands : Tahiti ; south slope of Orohena, steep bank in soil, " infrequent, at high altitudes ", 1200 m., 15 May 1927, *MacDaniels* 1542 (BISH, K).

Endemic.

12. **Carex savaiiensis** *Kükenth.* in Bull. Bishop. Mus. Honolulu, No. 128, 24 (1935).—Samoa, Savaii, *Christopherson* 800.

Tufted. *Rhizome* apparently not creeping. *Stems* erect, angles acute, sometimes narrowly winged above, 70–95 cm. tall, 1·5–2 mm. thick below, angles scabrid, especially above, surrounded below the leaves, by a few small cataphylls. *Leaves* basal and subbasal, sheathing the lower third to half of the stem and equalling to far exceeding it, 4–8 mm. wide, flat or flattish, margins sometimes revolute ; *sheaths* very long, ferrugineous in front or pale with ferrugineous spots, readily tearing. *Spikes* 5–8, erect to patulous or even cernuous, upper 4–5 at approximate or subapproximate nodes, fastigiate, lower more separated from one another, usually cylindric, sometimes conic, terminal male, 1·25–1·5 cm. long, slender, remainder androgynaeceous with very short male apices, 1·5–5 cm. long, 4–5 mm. thick, upper sessile, lower shortly peduncled forming a terminal inflorescence 4–9 cm. long ; *peduncles* firm, smooth below, angles scaberulous above. *Bracts* of the lower spikes much exceeding the terminal, upper bracts subfoliaceous or reduced to

longly awned glumes, lower rather longly to very shortly sheathing, upper without sheaths but more or less amplexicaul. *Cladoprophylls* probably typically ocreiform at the base of the sheaths in the lower spikes but more or less utriculiform at the base of those upper spikes which are sessile in non-sheathing bracts. *Female glumes* oblong, oblong-obovate, or widely elliptic-obovate, flattish to deeply cymbiform, apex obtuse or very obtuse to more or less rotund, 2–2·5 mm. long, 1·4–1·8 mm. wide, milky-white with reddish flecks and spots, nerveless except for a wide, less spotted, 3-nerved, central stripe, excurrent in a wide but tapering, sparsely setulose-margined awn, 1–2·25 mm. long ; *male glumes* often more or less oblong-elliptic, about 3 mm. long, nearly 2 mm. wide, awn nearly smooth, about 0·5 mm. long. *Utricles* (not fully developed) elliptic but tapering below, plano-convex, 3·5–4·5 mm. long, 1·25–1·5 mm. broad, subcoriaceous, strongly 4–6-nerved on each face, narrowly marginate, glabrous, stramineous, minutely reddish-papillose, apical part whitish-papillose, subpatulous, stipe-like base long, conic, spongy-thickened and ferrugineous, apex subabruptly beaked ; *beak* subcylindric, 0·2–0·3 mm. long, whitish, apex entire or subentire. *Achene* not developed. *Style* long, base slightly thickened.

Samoa Islands : Island of Savaii ; above Matavanu, bottom of crater, moist ground, 1500 m., 24 Sept. 1929, *Christopherson* 800 (BISH, K) ; ibid., swampy place in crater bottom, ± 1500 m., 30 July 1931, *Christopherson* & *Hume* 2229 (BISH, K).

Christopherson 801, from the locality of his 800, in Herb. Bogor. and Herb. Paris., is very immature and is placed here with some doubt.

Endemic.

13. **Carex inverso-nervosa** *Nelmes* in Kew Bull. 1946 : 11 (1946) et in Hook., Ic. Pl. tab. 3491 (1951).—New Caledonia, *Milne* 175.

Carex cernua Boott var. *lobolepis* (F. Muell.) Kükenth. in Engl. Pflanzenr. IV, 20 : 354 (1909), partim.

Loosely tufted. *Rhizome* apparently creeping. *Stems* erect, acutely angled, 60–100 cm. or more tall, 2–3 mm. thick below, smooth below, angles scaberulous above ; especially on the rhachis, surrounded at the base, below the leaves, by a few short-bladed leaves and reddish-brown cataphylls, which tend to split in front into fine reticulate or herring-bone shaped fibres. *Leaves* subbasal and 1–2 higher on the stem, mostly much exceeding the stem, 4·25–6·25 mm. wide, flat ; *sheaths* golden-brown, membranous and sometimes split into more or less reticulate fibres in front. *Spikes* 5–8, suberect to cernuous, upper at approximate or subapproximate nodes, fastigiate, lower more separated from one another, cylindric, upper 1–3 wholly male, or medianly female, lower female, or androgynaeceous with short or shortish male apices, 1·5 5·5 cm. long, male spikes and parts of spikes 1·5–4·5 mm. thick, female 5–7 mm. thick, upper subsessile to rather longly lower longly to very longly peduncled, forming a terminal inflorescence, 7–12 cm. long ; *peduncles* slender, angles hispidulous. *Bracts* mostly much exceeding the inflorescence but upper much reduced, bract of the terminal spike glumiform and longly or very longly awned, none or lower sometimes very shortly sheathing, mouth brown-auricled, nodes thickened. *Female glumes* oblong, sometimes

cuneate, flattish to cymbiform, sometimes involute, apex very obtuse to bilobed-emarginate, about 2 mm. long, about 1 mm. wide, whitish with small reddish spots and streaks, nerveless except for a wide pale-greenish 3-nerved central stripe, excurrent in a wide but tapering, hispidulous-margined awn, 1–3 mm. long. *Utricles* broadly elliptic-lanceolate or sometimes ovate-lanceolate, compressed plano-convex, 3·25–3·5 mm. long, 1·75–2·25 mm. broad, membranaceous, strongly 4–7-nerved downwards from the apex towards the base, narrowly marginate, glabrous, brightly ferrugineous below, duller above, minutely papillose, reddish-puncticulate, becoming patulous, scarcely or very shortly and stoutly stipitate, apex gradually or subgradually beaked ; *beak* subterete, 0·1–0·2 mm. long, apex pale, entire. *Achene* suborbicular, compressed plano-convex, about 2·25 mm. long, 1·6–1·9 mm. broad, warm brown, nitidous, densely and minutely puncticulate, with a very short stipe-like base and a straightish or slightly bent and twisted terete beak. *Style*-base not or scarcely thickened.

New Caledonia : Kanala, 1861–67, *Deplanche* in *Vieillard* 1466 (K, P) ; Pont des Français, 1868–70, *Balansa* 701 (K, P); *Balansa* 868 (P) ; *Pancher* (Mus. Neocal. 413) (K) ; La Neia, *Cribs* 988 (K, P) ; Isle of Pines, swampy places, mainland, Oct. 1853, *Milne* 175 (K).

Endemic.

14. **Carex graeffeana** *Boeck.* in Flora, 58 : 123 (1875).—Ovalau, *Graeffe* 1228.

Carex rechingeri Palla in Oesterr. Bot. Zeitschr. 57 : 424 (1907)—Samoa Islands, *Rechinger* 1106.

Carex graeffeana Boeck. var. *samoensis* Nelmes in Kew Bull. 1938 : 110 (1938).—Samoa, *Vaupel* 467.

Rhizome unknown. *Stems* erect, acutely angled, faces concave, 80–100 cm. tall, 2·5–4 mm. thick below, smooth below, scabrid above including the rhachis. *Leaves* basal and subbasal and 1 higher on the stem, much exceeding the stem, 5–12 mm. wide, flat with strongly revolute margins ; *sheaths* membranous and reddish-tinged in front and sometimes golden-reddish or reddish-nerved at the nodes. *Spikes* 15–27, erect to cernuous, upper at approximate nodes, fastigiate, lower more separated from one another, cylindric, 1–3 just below the uppermost are smaller to much smaller than the remainder, 1–2 (6) cm. long, 1–2 (3) mm. thick, wholly male or androgynaeceous with a very short male base, remainder androgynaeceous, 3–11 cm. long, male part slenderly cylindric, usually forming about the upper quarter of the spike, 1–2·75 mm. thick, female part cylindric, 1·5–2 mm. thick in flower, 3–5 mm. thick in fruit, upper shortly or rather longly lower longly or very longly pedunculed, forming a terminal inflorescence 10–30 cm. long ; *peduncles* rather slender, angles smooth or sparsely scabrid. *Bracts* of the lower spikes not to much exceeding the stem, upper bracts reduced to longly awned glumes, none completely sheathing but upper slightly and lower strongly subamplexicaul and auricled at the base. *Female glumes* more or less oblong with a rounded apex to oblong-ovate or oblong-lanceolate, flattish to cymbiform, apex subobtuse to very obtuse, 1·4–2·5 mm. long, 0·5–0·75 mm. wide, dark- or blackish-red, margin, in the upper half at

least, very narrowly and irregularly whitish-hyaline, midrib with 2 adjacent nerves on a pale green stripe converging upwards and becoming confluent, excurrent in a flat, wide but tapering, hispidulous-margined awn, 0·3–0·4 mm. long, *Utricles* more or less elliptic, plano-convex or biconvex, 1·8–2·5 mm. long, 0·9–1·25 mm. broad, subcoriaceous, distinctly multinerved, ventral face medianly ridged, narrowly marginate, glabrous, stramineous-green, becoming reddish-brown, not puncticulate nor papillose, straight or straightish, becoming patulous, base brown and spongy-thickened, not stipitate, apex subabruptly beaked ; *beak* subterete, 0·2–0·3 mm. long, apex entire or subentire ; *mouth* slightly on the dorsal side. *Achene* elliptic, obovate-elliptic, or obovate, biconvex or compressed-biconvex, 1·4–2 mm. long, 0·8–1 mm. broad, pale green becoming brown, puncticulate and with very slender longitudinal lines, not or scarcely stout-stipitate, apex rounded, erostrate or minutely beaked. *Style* short, often bent, base not or scarcely thickened.

Fiji Islands : Ovalau ; *Graeffe* 1228 (K). Viti Levu ; Nandarivatu, forest near the summit of Mt. Victoria, 1200 m., Sept. 1907, *Gibbs* 796 (BM) ; ibid., Lautoka, Mt. Evans, in wet places on the mountains, in big clumps, 3 Oct. 1920, *Greenwood* 120 (K) ; ibid., Lautoka, Mt. Evans, in clumps in or near small creek and on open sunny places, ± 900 m., 24 Sept. 1944, *Greenwood* 120A (AA, K).

Samoa Islands : [without precise locality] *Whitmee* 27 (K) ; Savaii ; Mataana [Matavanu ?], 1600 m., 4 Nov. 1905, *Vaupel* 467 (K) ; ibid., Maunga-afi volcano, in the virgin forest, 1300 m., July 1905, *Rechinger* 1106 ; ibid., above Matavanu crater, forest, 1300 m., 24 Sept. 1929, *Christopherson* 803 (BISH, K, P) ; ibid., place in crater bottom, ± 1500 m. 29–30 July 1931, *Christopherson & Hume* 2209 & 2228 (BISH, K, P) ; Papafu, openings in low forest, rim of crater, 1500 m., 23 Sept. 1931, *Christopherson* 2761 (B, P).

I have not seen Rechinger's plant, which was destroyed in the second world war, but from Palla's description I feel fairly certain that it is *C. graeffeana* Boeck.

The following plant, determined by the collector as *C. graeffeana* Boeck., is in my opinion not this species and may be new but it is too immature to name with certainty.—Cook Islands ; Rarotonga ; damp places, hillsides, 225 m., 5 April 1929, *Wilder* 1068 (BISH, K).

Subgen. 3. **Vignea** *Nees.*

Sect. 8. **Paniculatae** *Kunth,*

Enum. Pl. 2 : 389 (1837).

Spikes androgynaeceous, numerous. *Utricles* coriaceous, margins obtuse, setulose above.

Only Polynesian species . . . . . 15. *C. appressa*

15. **Carex appressa** *R. Br.*, Prodr. Fl. N. Holl. 242 (1810) ; Kunze, Suppl. Riedgr. 45, t. 11 (1840–50) ; Boott, Illustr. 1 : 46, tt. 119, 120 (1858) ; Kükenth., 178, fig. 29, E–J ; in Engl. Bot. Jahrb. 69 : 261 (1938) ; Nelmes, 432 ; S. T. Blake in Journ. Arn. Arb. 28 : 101 (1947). —New South Wales, *R. Brown.*

Densely tufted. *Rhizome* woody, stout, not creeping. *Stems* erect, angles sometimes very acute, rigid, 35–150 cm. tall, 2–4 mm. thick below, smooth below, angles scabrid above or just below the rhachis, clothed at the base, below the leaves, by spadiceous or lighter cataphylls with dark to black nerves and their fuscous fibrous remains. *Leaves* subbasal and above, shorter to longer than the stems, 3–10 mm. wide, flat, margins sometimes revolute to conduplicate, very stiff, margins scabrid above, longly sheathing ; *sheaths* reddish-brown-nerved on the back, whitish-membranous in front and fraying into sometimes reticulate fibres. *Inflorescence* a slender, contracted, oblong-cylindric panicle, 4–20 cm. long, 7–20 mm. broad ; *panicle branches* numerous, lower oblong-lanceolate, upper ovoid or ovoid-lanceolate, adnate or more or less adpressed to the stem below, upper down to 5 mm. lower up to 3·5 cm. long, 0·3–1 cm. thick, upper contiguous or crowded, lower at approximate or sub-approximate nodes but continuous, sessile, with closely aggregated simple or branched spikes, upper sometimes reduced to simple spikes. *Spikes* ovoid or ovoid-lanceolate, 4–8 mm. long, few-flowered, patulous, sessile, male and female parts about equal in length. *Bracts* of the lower panicle branches setaceous, sometimes as long as the branches, upper bracts reduced to glumes with long, ciliolate-hispidulous awns, inconspicuous. *Female glumes* widely ovate to ovate-elliptic, cymbiform, apex acute to subacute, 2–2·8 mm. long, 1·8–2·25 mm. wide, glabrous, bright light castaneous, margins sometimes irregularly widely whitish and nerveless, pale below and usually with a pale midrib, or wholly whitish, slenderly plurinerved, margins ciliolate from near the base upwards, midrib often excurrent in a ciliolate mucro up to 0·4 mm. long. *Utricles* ovate or oblong-ovate, plano-convex, 2·3–3·5 mm. long, 1·2–1·9 mm. broad, hard, plurinerved, marginate, especially above, glabrous, margins setulose above or only at the apex, straight, patulous to subpatent, becoming dark brown, base rounded or truncate, very spongy-thickened, shortly stipitate ; *beak* tapering below, plano-convex, 0·5–1·25 mm. long, marginate, glabrous, margins setulose, straight, bidentate, very narrowly brown-grooved down the back ; *mouth* slightly dorsally oblique ; *teeth* lanceolate, straight, pale to reddish, glabrous or glabrescent. *Achene* obovate, ovate, elliptic, or slightly rhomboid, subplano-convex or biconvex, 1·5–1·8 mm. long, about 1 mm. broad, tapering to a stipe-like base, apex rounded or rounded-truncate, beakless or very shortly and sometimes bent-beaked. *Stigmas* 2.

New Caledonia : 1861, *Deplanche* 105 (P) ; Bourail, 1868–70, *Balansa* 869 (P) ; 1868–70 Canala, *Balansa* 1923 (P).

New Guinea, Australia, New Zealand.

A Scotsman's Garden in Italy.*—In a beautiful position on a promontory above the town of Verbania-Pallanza on the southwestern shore of Lake Maggiore is a garden which has no parallel in Italy, nor, indeed, anywhere in southern Europe. This is the garden made by Capt. Neil

* The Villa Taranto. A Scotsman's Garden in Italy. By Neil McEacharn. pp. 88, frontispiece, plan, and 50 photographs. London. Country Life. 25/-.

McEacharn at the Villa Taranto. About 100 acres in extent, it is laid out on the lines of the great private gardens in Britain, and contains so extensive a collection of plants of fine quality that it compares favourably with the best gardens in these islands. The plants, drawn chiefly from the temperate and warm temperate regions of the world, with those from Asia and North America strongly represented, are nearly all grown out of doors, most of the glasshouses being used for propagating purposes. Though " garden " varieties are well represented, the collection is mainly of species, and the Villa Taranto garden is in fact, if not in name, a botanic garden. Summers at Pallanza are long and hot, and often very dry, but provision was early made for ample supplies of water to all parts of the garden, and this, with planting under light woodland, has widely extended the number of species that can successfully be accommodated. The winters are cold, with snow and frozen ground for several weeks each year, and it seems strange, at first sight, that many plants, which are hardy in Britain only in the milder parts of the south and west, should flourish out of doors at Pallanza.

It was in 1930 that Capt. McEacharn bought the property now known as Villa Taranto in order to make a garden there, and in the book now under review he tells his story. He explains how he gradually developed and planted the site, how the Villa and garden were looked after amazingly well during the war years by Dr. Cappelleto and his wife, who had been left in charge and who carried on with a very small staff, and so to the work that has been done (and is being done) in the post-war period. Inevitably many species were lost during the years 1940–45, but since then no efforts have been spared to repair the losses and to increase the collection. Other chapters are devoted to a description of the garden, while a list of plants of special interest is given as an Appendix. The text is illustrated by a plan of the garden and fifty-one splendid photographs which show many aspects of the garden as well as some of the fine plants.

The Villa Taranto garden is open to the public, and it is already fulfilling a very valuable educational role, inasmuch as it is introducing to the Italians (and to tourists from many other countries) a far greater range of garden plants than they had known hitherto. The Italians are great lovers of flowers, but the number of different kinds of plants grown in Italian gardens is pitifully small compared with the average in this country. Inevitably the collection at Villa Taranto arouses great interest—and brings numerous enquiries as to sources of supply of the more decorative species.

Capt. McEacharn long ago made provision for the continuance of the garden, by arranging that it, together with the botanical library, shall eventually pass to the Italian nation as a National Botanic Garden, with which will be associated a School of Horticulture. We are very glad to have, in this book, his own account of the genesis of his garden, the more so in that, in addition to the enjoyment to be found in reading the book, the latter constitutes a valuable record for the years to come.

J. Robert Sealy.